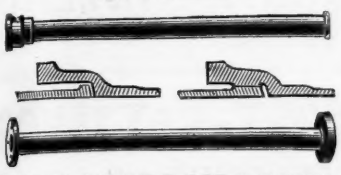
THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXI. No. 1820.] LONDON, MARCH 29, 1898. [50TH YEAR. PRICE 6d.

GAS AND WATER PIPES

1¼ to 12 IN. BORE.



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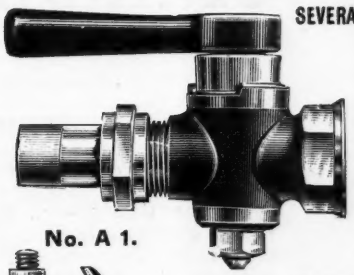
SEVERAL DESIGNS SHOWN BELOW.



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THESE TAPS ARE

FULL-WAY

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SUPERIOR QUALITY AND FINISH IN GUN METAL.

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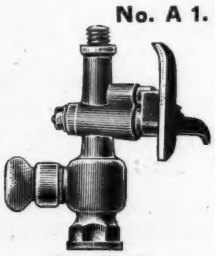

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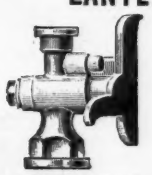

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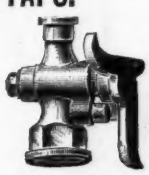

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No. A 11.

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CUBIC FEET OF GAS PER LINEAL FOOT OF RETORT (Ordinary Section) per 24 HOURS from ENGLISH COAL, and

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Together with every other possible Advantage.

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Glass Casing—viz., Cylinder and Bottom Dish—made in one piece; consequently Incandescent Mantles are preserved from injury caused by Draughts and Dust entering through the crevices of ordinary glazed Lanterns.

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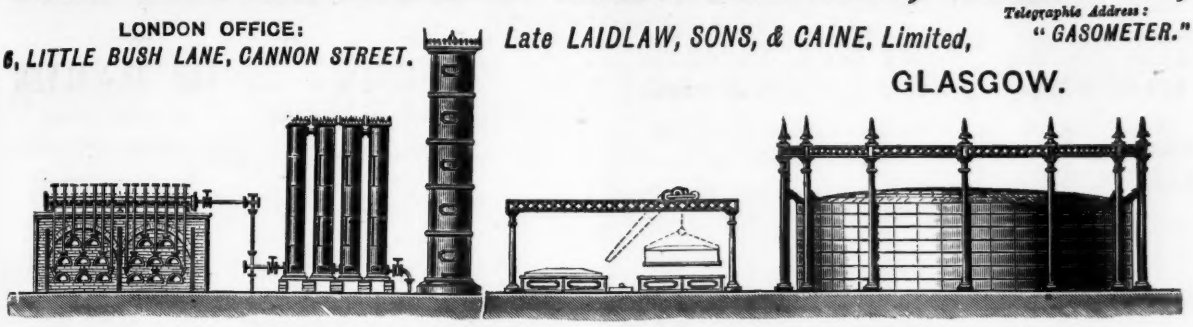

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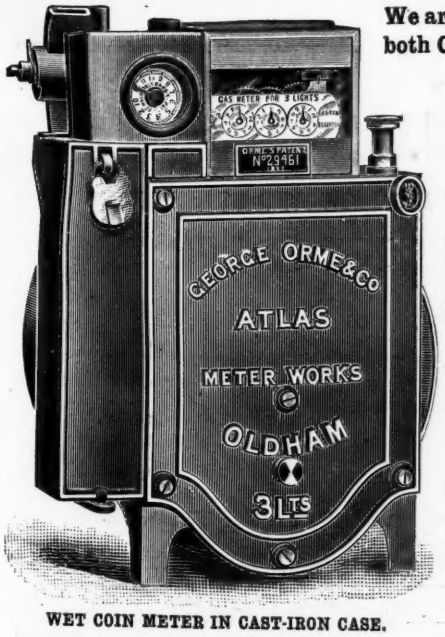

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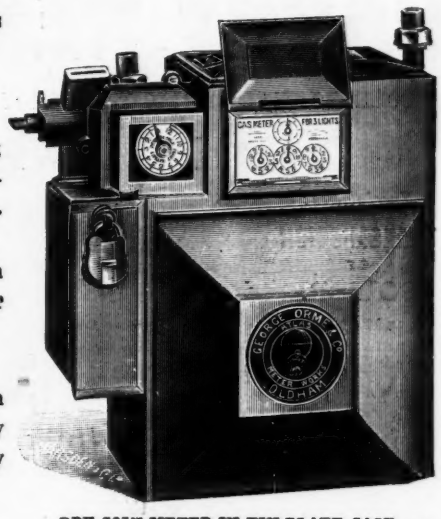

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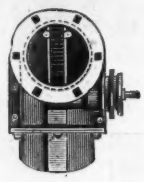

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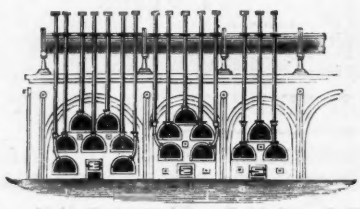

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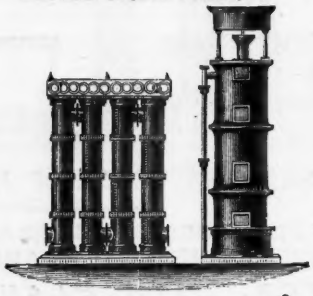

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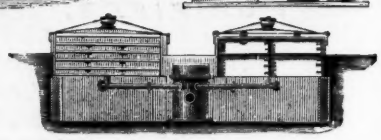

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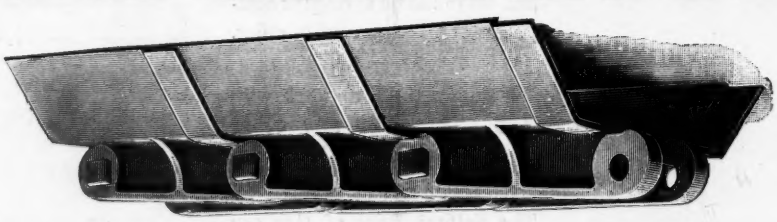

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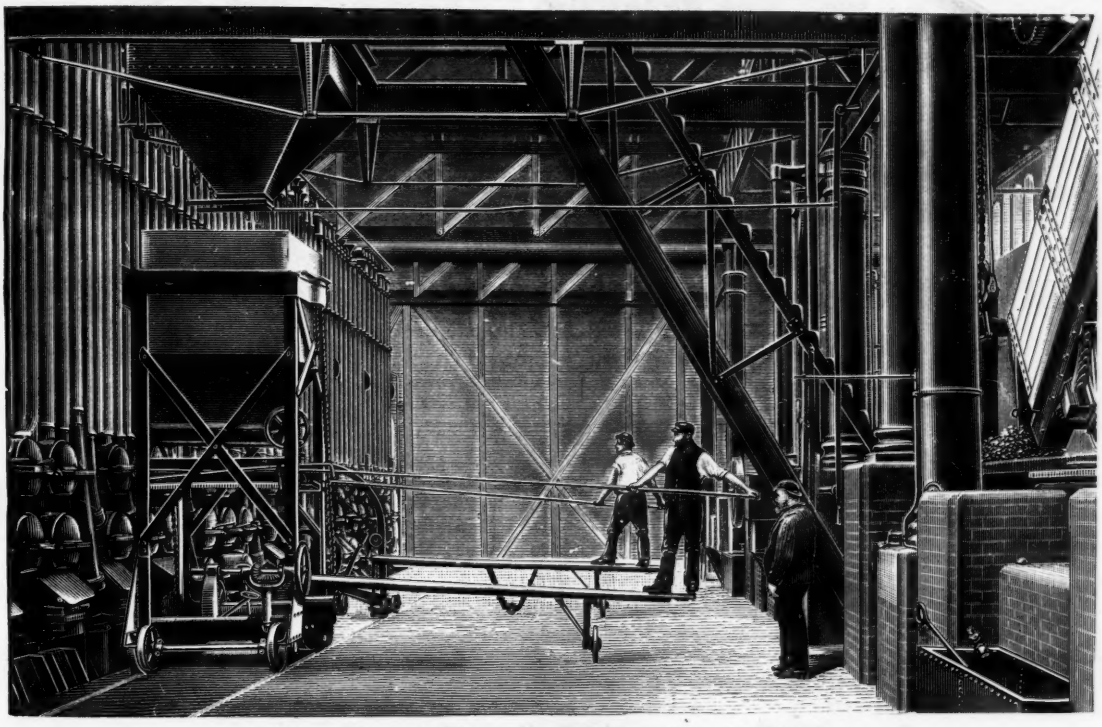
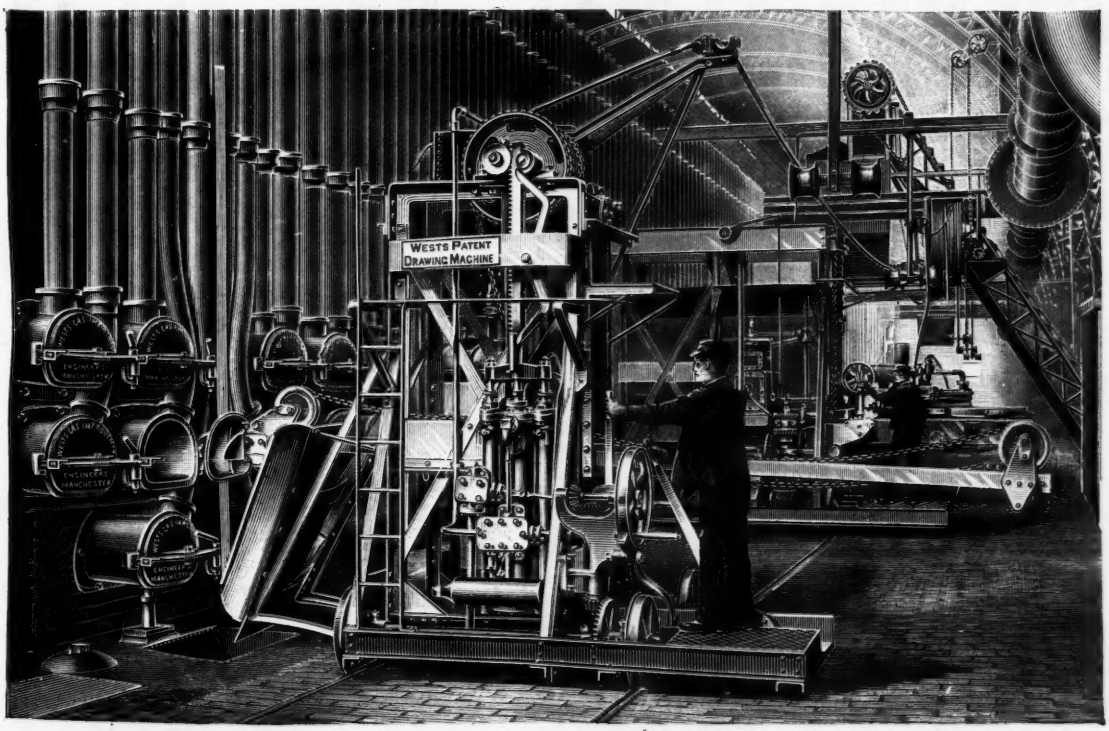


West's Manual Charging and Drawing Machines.



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PREPAYMENT GAS-METER

FOR PENCE, SHILLINGS, OR ANY COINAGE.

THE ADVANTAGES OF THIS SYSTEM ARE:

1. Simplicity of Mechanism.
2. Absolute Accuracy.
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4. Unaffected by irregularities in shape or thickness of the penny.
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GUARANTEED FOR FIVE YEARS.

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Highest Efficiency with Greatest Economy.

LIGHTING AUTHORITIES, GAS ENGINEERS, and GAS MANAGERS

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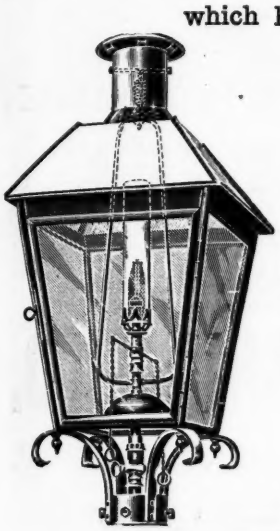
(Welsbach System),

which has now been successfully adapted to the purposes of

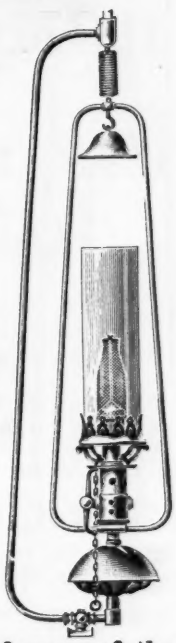


STREET LIGHTING,

the difficulties caused by VIBRATION having been OVERCOME by the use of the

NEW SPRING SUSPENSION FRAME (Patent).

This System of Lighting meets the requirements of all Lighting Authorities in those Districts where it is desired to effect an Improvement in Street Lighting WITHOUT INCREASE OF EXPENDITURE.



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"In the matter of maintenance of the street lights, the record is favourable—in fact, more so than the estimate provided. By the test-meter, the average daily consumption works out to 38 cubic feet per light, including bye-pass. The bye-pass consumes with a flame half an inch long, $\frac{1}{5}$ foot per hour. This represents 1000 cubic feet per lamp per annum. The average consumption per light, when in use, works out to 12,900 feet per annum, or about $3\frac{3}{5}$ feet per light per hour. The lighting is continued all the year round, from the average times of one hour after sunset to one hour before sunrise."

"The mantles have worked out to an average of three per lamp per annum; but, bearing in mind the absence of frost last winter, the writer believes that four mantles per light is more likely to represent average conditions."

"In the matter of cleaning, it may be said that the lanterns require less attention than with the ordinary flat-flame burner."

"The number of lights attended to per man averages 85."

"The 'Welsbach' Light is undoubtedly one of the greatest aids to successful competition that the Gas Industry has ever experienced. Its influence, while reducing the relative cost of light, has advanced the consumption of gas all over the country by the increased satisfaction of the existing consumers, and the attraction of others. The writer feels that its influence should not be confined to the house. It is capable of meeting every competitor in the street, from cheap oils to arc lights, in cost and in effect; and it is hoped that the foregoing experience may lead many others to seek its aid and to realize its efficiency."

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OIL FOR GAS MAKING

PURE DISTILLATE.

HOMOGENEOUS IN CHARACTER.

NO MIXTURE.

CAN BE STORED SAFELY ANYWHERE.

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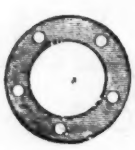

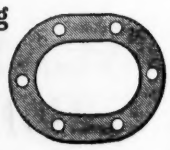

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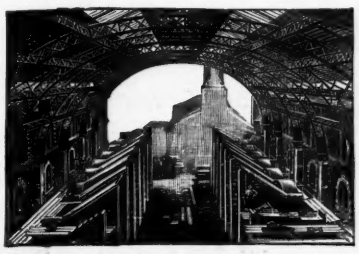

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PATENT SCRUBBER-WASHERS,
All sizes,
From 50,000 to 5,000,000 Cubic Feet of Gas per day.
Results unrivalled. Send for Particulars and Prices.

MALLEABLE
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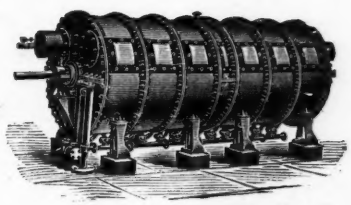
CASTINGS.



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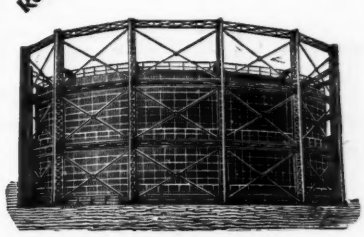

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CENTRE-VALVES,
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and METERS.

Rotary or Pump
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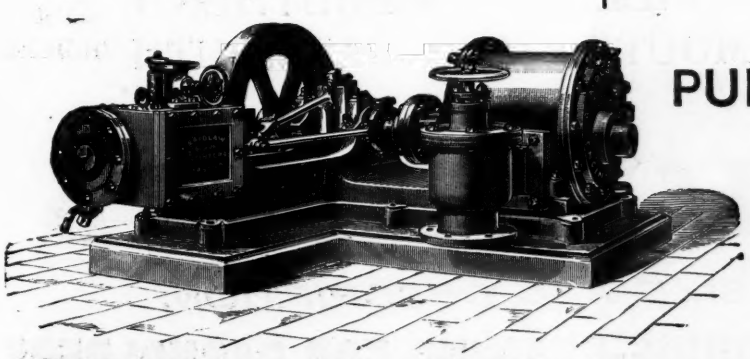

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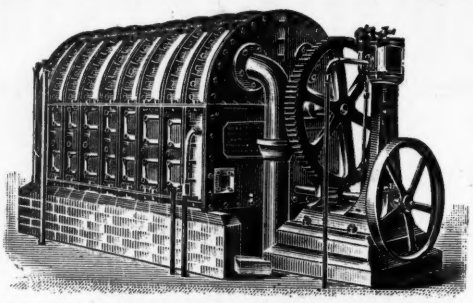

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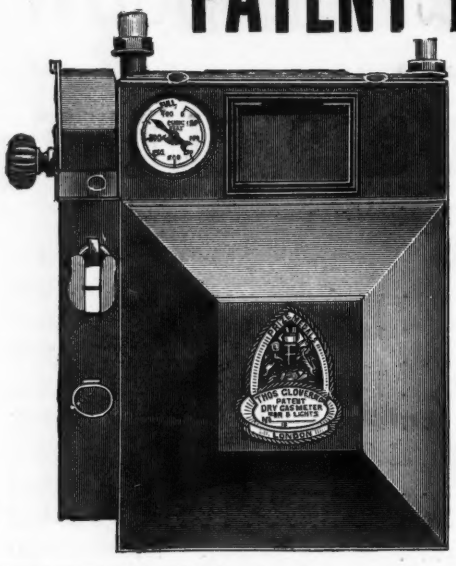

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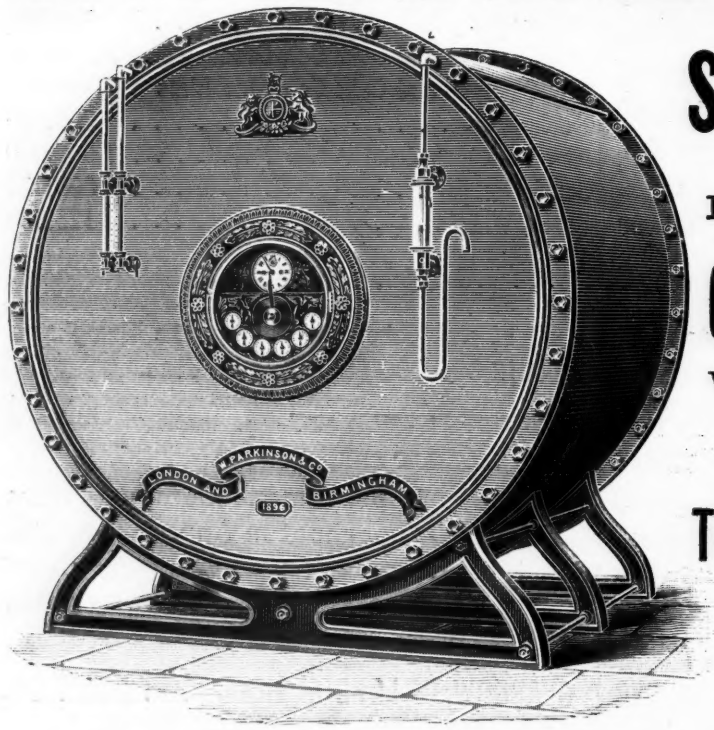

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EDITORIAL NOTES.

Private Bill Business—Good News for Gas Managers.

PRIVATE Bill business at Westminster went briskly forward last week; and a review of the doings of the Committees during the past fortnight discloses the main line of action which Parliament is now disposed to follow in settling Gas Bills. It is clear that the policy of transferring gas undertakings to Local Authorities is commending itself to Select Committees as strongly as the authorities appreciate the expediency of taking over gas supply. The pendulum has swung back again, after the period of abstention from touching gas property which followed the electric light scare. Now we see Local Authorities everywhere anxious to take over gas-works, especially, of course, where the Company are seeking statutory privileges which would tend to increase the value of their property in the future. The attempt to insert a purchase clause in the Redhill Bill was an indication of how the wind sets; and the ready passing of the Bill of the Morley Corporation by the House of Lords Committee last week confirmed it. No formal acceptance by the Company of the Corporation's offer to purchase under the Lands Clauses Act instead of under the Arbitration Act, as originally proposed, stands in the record. Hence, on the face of it, it looks as if the Committee had created the grave precedent of passing an independent Purchase Bill against the opposition of the Company. In point of fact, however, what it means is merely that the Company were standing out for the best terms they could get from the Corporation; and in this they received the support of the Committee.

The case of Yeovil, disposed of by another Committee of the House of Lords, is of exceptional interest. The district is supplied by a non-statutory Company who sought incorporation; and the Corporation, who were in Parliament for other purposes, wanted powers to purchase the undertaking within two years, under the Lands Clauses Act. Here, therefore, was a case of a limited Gas Company, supplying an improving district, seeking an entirely new status, and of a Local Authority thinking it a good opportunity to take the supply into their own hands. There could not be a clearer presentment of the issue. Counsel for the Corporation treated the principle of the municipalization of gas supply as of established expediency. It was pointed out that the proper object of a commercial Company is to make a profit, whereas that of a Corporation would be merely to make both ends meet, "and the cheaper they could supply gas the better it "would be for the consumers." Unfortunately, this is precisely the point at which the interest of a Corporation is apt to part company with that of the consumers, as Mr. George Livesey told the Committee in regard to Redhill and Reigate; and counsel did not offer to carry on the works without making profit. There was no question of failure on the part of the Company to do their duty; and the works were admitted to be in advance of the requirements. The only points the Corporation could bring forward in opposition to the grant of statutory powers to the Company—apart from their desire to purchase—were that the site of the works is undesirably close to the town, and that there is an old Corporation Act under which authority exists for establishing gas-works for lighting the public streets. In these circumstances, Counsel for the Company asked the Committee to pause before saying that it was a matter of general policy that the undertaking should be passed over to the Corporation simply and solely because the latter desired it. The opposite matter of policy, between which and the former the Committee had to choose, was whether a limited Gas Company of unblemished record should be incorporated on demand. In the event, the Committee decided in favour of the Corporation on the point; but the Company were invited to draft the terms of purchase which they were willing to accept. Nothing could be fairer, when once it is understood that the general principle of the municipalization of gas undertakings is to prevail. We give the purchase clauses *in extenso* in our report of the proceedings; because they constitute a precedent of supreme importance. The purchase is none the less compulsory, against the desire of the Company, for the fact that they wisely yielded to the sense of the Committee. In return, the Committee would have no higgling over terms. The noble Chairman said the feeling of the Committee was that the works must be taken over exactly as stated.

They intended to be very liberal to the Gas Company, because they had compelled them to sell the undertaking, which the Company did not desire; and so they must be treated liberally.

One of the happiest results of this notable Yeovil settlement is that there is at last a fair precedent set for making proper provision for the officers and servants of an expropriated Gas Company. Only too often, in transactions of this kind, the shareholders and directors alone are looked after; and when the final division of the property is made, they take the utmost farthing—leaving their servants to the tender mercies of other masters, who naturally prefer new blood in the concern. It is fitting that gas managers throughout the kingdom should know the names of the professional gentlemen engaged in this Yeovil Bill, to whose thoughtfulness they, as a class, are indebted for this signal boon. They are, for the Company, Mr. W. A. Valon, Mr. T. Newbigging, and Mr. Corbet Woodall as Consulting Engineers, and Mr. Balfour Browne, Q.C., Mr. Freeman, Q.C., and Mr. Lloyd as Counsel. The Parliamentary Agent is Mr. John C. Ball. For the Corporation—who agreed to the terms—there appeared Mr. E. H. Stevenson, as Consulting Engineer; and Mr. Worsley Taylor, Q.C., Mr. Moon, and the Hon. F. Thesiger as Counsel. Messrs. Dyson and Co. were the Agents. We give all these names in order that gas managers who may at any time find themselves in the same case as Mr. Howell, of Yeovil, may know that there are many professional advisers of Gas Companies and Corporations who have stood their friends this time, and may be trusted to do so again. There are others, also, who did not happen to have anything to do with the creation of this Yeovil precedent, but will certainly applaud and make a note of it for future use. The great thing is that justice has been done; and Parliament does not go back upon its actions. Henceforward, the watchword of the gas manager in Parliament will be "Remember Yeovil!"

There was no question of principle in connection with the Edinburgh and Leith Bill, which is to enable the Gas Commissioners to remove their works to a new site at Granton. It passed the Lords Committee without important modification. The next Bill in the same group was that of the Stirling Gas Company, opposed by the Corporation on points of detail respecting dividend and initial price. The Corporation were also seeking to preserve their existing right to purchase the undertaking, which, however, had remained unexercised owing to the opposition of the ratepayers to the carrying out of the award in last year's arbitration. The Committee passed the Bill with the amount of capital unaltered, and made the initial price 3s. 6d., with no increase of dividend until the selling price dropped below 3s. 4d., the present figure. A suspensory purchase clause asked for by the Corporation was refused. A Commons Committee passed the Thanet Gas Company's Bill, with a protecting clause inserted at the instance of the Margate Corporation, who feared that the construction of works on the site proposed by the Company would affect the source of the town's water supply. The Frodingham Bill was unfavourably received, and was withdrawn on one of the Local Authorities concerned engaging to promote a Purchase Bill next session. We stated last week that the Swansea Company's Bill had survived the opposition of the Corporation. Now we have to record that the application of the Company for an injunction to restrain the Corporation from opposing their Bill without taking the regular course presented by the Borough Funds Act has succeeded; the Court granting the injunction as prayed.

"Gas v. Electricity"—A Criticism.

A LETTER which, as the French say, "gives one to think," appeared in the "Pall Mall Gazette" of the 23rd inst. It was entitled "Gas *v.* Electricity," and was anonymous. The latter consideration, however, is of no importance, inasmuch as the writer neither discussed persons nor affected authority, but commented upon the accepted facts relating to the supply of gas and electricity in the Metropolitan area. The object of the letter was "to review "the position of affairs put forward in the balance-sheets "and by the Directors in their speeches" at the recent half-yearly meeting of the London Gas and Electricity Supply Companies, "with The Gaslight and Coke Company "in the van and the Chelsea Electricity Company bringing "up the rear." In point of fact, however, the critic, who allows his *pro*-electricity bias to appear in every line of his letter, confines his study of the position of gas to the single example of The Gaslight and Coke Company. He diagnoses the situation as follows: "In the case of the "electricity supply concerns, the record is one of con- "tinuous and rapid progress, increasing dividends, and "good prospects; while the Gas Companies appear at "last to have reached the point in their prosperous career "when the expansion of the sales of gas to which we have "been accustomed so long, has attained its maximum. "This is especially so in the case of The Gaslight and Coke "Company, the Directors having once more to fall back "upon the reserve in order to pay the full statutory divi- "dend." The writer refuses to accept the reasons offered by the Governor of The Gaslight and Coke Company at the general meeting for the existence of "a state of things "that ought, one would think, to give the proprietors of the "Company grave cause for concern." The residuals trade may be bad, and the climatic conditions may not have been favourable. But these are at most influences incidental to all businesses of similar kind; "and though they "may affect the finances of the Gas Companies in a "temporary way, the expansion in the sales of gas should "be more than sufficient to compensate for any depres- "sion caused in this manner." It is the growth of the electric lighting business, more than anything else, which is, to the mind of the writer, "responsible "for the fact that the Directors of the [Gaslight and] Coke "Company do not find their sales of gas sufficient to "enable them to pay the full dividend without having "recourse to the dividend reserve fund till that is now all "but exhausted." Recounting the tale of the number of electric lights in nightly use in the West-end of London, the critic observes that "though it cannot be said that each "electric lamp fitted up represents one gas-burner the less, "it is plain that where electricity is available it has already "ousted gas for lighting purposes to a most extraordinary "extent." This reduction of the consumption of gas, it is asserted, would have been made evident to the shareholders of the Gas Company long ere this, but for the coincidence of the development of the use of gas for cooking, heating, and power purposes having occurred at the same time, "so that the income derived from this source has "practically sufficed to counterbalance the falling off "that must have resulted from the withdrawal of so many "thousands of gas-burners." Also, though the writer does not mention it, the contemporaneous introduction of prepayment meters has had the same effect of masking the ravages made by electricity in the central regions of the Metropolis.

The most important question arising out of this very keen effort in criticism is the degree in which its conclusions may be regarded as affecting The Gaslight and Coke Company in particular, and how much of it applies to the gas supply of London as a whole. The critic himself wishes to make his readers believe that the present case of The Gaslight and Coke Company, as he sees it, will eventually be the case of the other London Companies and of Gas Companies everywhere. "By degrees, as the Elec- "tricity Companies extend their operations, all the Gas "Companies will feel the pinch; and while for a time "they may perhaps be able to recoup themselves to some "extent for the loss of lighting customers by manu- "facturing a cheaper gas for heating and cooking purposes, "they will eventually have to face the competition of elec- "tricity in that department of their business as well, for "the improvements which the march of time will inevitably "bring in its train must enable electricity to be used "economically for all purposes for which gas is now em- "ployed." This is going a little too fast. The case even of The Gaslight and Coke Company is not so bad as is sought to be made out here. The increase of gas consumption secured by the Company for the past year is by no means of trifling amount; albeit the records of the Company for the past ten years certainly disclose the fact that the undertaking has during this time received a check that did not similarly affect the other Metropolitan Gas Companies. It is open to be argued that the worst is passed in this regard, for Central and West London. As to the other Metropolitan districts, the causes that have kept electric lighting out of them hitherto are likely to continue to operate in the same way. It will be interesting to watch the fortunes of the Brush Company in the Wandsworth and Putney district, in competition with gas at 2s. 2d. per 1000 feet. Meanwhile, it will be consolatory

to reflect that the strictures of the "irresponsible critic" of the "Pall Mall Gazette" correspondence columns are justified—so far, that is, as they are justified at all—only in regard to the experiences of The Gaslight and Coke Company. If the competition of electric lighting had been the sole, or even the heaviest affliction of this vast undertaking during the past ten years, it would not have been in the position it occupies to-day of being the "dreadful example" of the Gas Company who cannot pay their way.

Epilogues of the Engineers' Strike.

THE lamented death of Colonel Dyer, the Chairman of the Federated Employers in the engineering trade, removes from the industrial world a personality which was one of the hidden forces of engineering enterprise until the great strike and lock-out in the trade revealed him to the world. Readers of the "JOURNAL" would not in the ordinary way have much to do with the suave gentleman who, from being an officer of gunners, became a Director of Armstrong's, and finally Managing-Director of the Manchester branch, originally Whitworth's. But when the maintenance of industrial liberty and the natural rights of employers in the engineering trade was made a political question, the name of Colonel Dyer became if not a "household," at any rate a "shop" word in the land. He was well marked out by his personal character and his position in the trade for the post of leader of the great association of employers; and it is only common fairness to record that when the struggle was ended by the unconditional surrender of the anarchistic forces arrayed against the Federation, nobody had a word to say against the conduct of the victorious leader, from start to finish. The fact was a remarkable testimonial to the personal qualities of a man upon whom all the rancour of an unscrupulous party in industrial and general politics had been directed for months. The Socialists, and the Trade Unionists, and the popularity-hunting politicians of all grades, might rave and froth and trim from day to day; but the calm gentlemen at the head of the silent forces of intellect and wealth kept on their even way along the road that led to what they conceived to be the just conclusion. At last they won it; but at a heavy cost. It would be rash to say that the strain of those anxious weeks killed Colonel Dyer. Probably he did not take all those wearisome conferences so seriously as the other side did; but he was not a strong man, and so much extra work must have told on his reserves of vital energy. The most prominent figure on the other side—Mr. G. N. Barnes, General Secretary of the A.S.E.—is actively engaged at present in seeking re-election. Of course, he wishes to persuade his constituents that it was not he who was responsible for the late strike or its calamitous results. These professional "Labour leaders" are very Napoleons in the matter of despatch writing from the wrong side of the field. Mr. Barnes is opposed by the former Secretary, Mr. Anderson, who offers to do his best to restore the Society to the position it occupied before the younger horde of agitators obtained possession of it. The squabble between these two representatives of the old and the new order in Trade Unionism is of less importance than it would have been before the recent troubles.

Asphyxiation by Gas in Massachusetts.

THE Thirteenth Annual Report of the Board of Gas and Electric Light Commissioners of Massachusetts has just come to hand, for which we are indebted to the courtesy of Mr. F. E. Barker. We cannot discuss the volume at length here; but it may be as well to draw attention to the fact that it contains a special report "relative to certain "deaths from asphyxiation by illuminating gas," which was ordered by the House of Representatives of the Commonwealth of Massachusetts. The House appears to have been disturbed by the frequency of cases of gas poisoning in Boston, and directed the Board of Gas and Electric Light Commissioners to investigate the deaths from this cause that occurred during the first three weeks of the month of January, 1897, with a view to recommending remedial legislation. The terms of the reference seem limited; but it may be concluded that any case of true gas poisoning is typical of many; so that what would prevent one would be equally efficacious with any number. The State Legislature also directed the attention of the Board to certain recommendations which had been formulated with the object of stopping these casualties, one of which—the most important—was that the proportion of carbonic oxide in illuminating gas should not be allowed to exceed 16 per cent. At present, the Companies supplying carburetted water gas send out 26 per cent. of this component in their gas, while the coal-gas Companies sell from 6 to 8 per cent. of it in their product. Two of the three Commissioners think that if the question were one of reducing the 26 per cent. to the 6 or 8 per cent., the gain of public security would be considerable. This is not the question, however, inasmuch as the Gas Companies could not conform to the condition of selling nothing but coal gas. As between 26 per cent. of carbonic oxide in carburetted water gas, and a mixed gas showing 16 per cent. of carbonic oxide, the same Commissioners profess themselves unable to discriminate, from the point of view of public security. They doubt if the lower percentage would result in any considerable diminution of the number of fatalities. One of the Commissioners, in a minority report, disagrees with this view. He holds that the suggested reduction of the percentage of carbonic oxide would make a considerable diminution in the death-rate, and argues that the experiment is at any rate worth trying by the Gas Companies "since their interest cannot lie in the increasing death-"rate." The whole question is evidently one of degree; but matters have arrived at such a pitch in Boston that even the State Legislature concludes that something ought to be done. Whether or not anything will be done after all does not appear.

WATER AND SANITARY AFFAIRS.

IN the evidence given by Sir John Lubbock before the Royal Commission on the Water Supply of London last week, there is one point of considerable importance which is very likely to be overlooked, and which has received little or no consideration in the past. Mr. Freeman, representing the London County Council, challenged Sir John Lubbock as agreeing with the Council in the desirability of going far afield for a fresh supply. In response, Sir John said he was disposed to think this would be a wise course to adopt, but "it was one which involved very intricate "questions." Giving another turn to the subject, he proceeded to say "he did not think it would be impossible for "the Companies to go to Wales for water," for which purpose he suggested there would be an advantage in partial amalgamation. Sir John apparently had an idea that the Thames was a natural dividing-line in amalgamating the Companies; and he would entirely exclude the Kent Company, as having sufficient sources of supply at present. But he conceived that something less than absolute amalgamation might be adopted; the Staines scheme being undertaken by three Companies in combination, though not amalgamated. Sir John remarked that the Companies had never suggested a combined movement for taking up the Welsh scheme, so far as he was aware. It certainly appears, on reflection, somewhat singular that a supply from Wales has always been looked upon as if it could only be identified with the County Council. Yet it is not their peculiar property, and if it is to be secured at all, it is more naturally connected with those who have charge of the present supply. In the latter case, it would simply be a shifting of the intakes, though it is a long stretch from Hampton and Sunbury to the Usk and the Towy.

However remote the contingency may appear, that London should draw a supply of water from Wales, the inhabitants of the Metropolis should be given to understand that such an enterprise, if ever undertaken at all, falls in the first place within the functions of the Water Companies. If the change is shown to be necessary, and the Companies refuse to introduce it, the task may be entrusted to other hands. The Royal Commission under Lord Balfour showed that no such change was requisite short of a far-off future. On the other hand, the Companies may enter upon it whenever they please, if Parliament consents. The great consideration is that of expense. Is so huge an enterprise within the pecuniary resources of the Companies? Are they to double their capital account in order to bring in a supply of water from Mid-Wales, supplemental or otherwise? Yet, if the work is to be done at all, they are the people to do it. For this purpose they must combine, if they do not actually amalgamate. They know how to do the work at the least cost; and the distributing plant is already their own. The Metropolitan

ratepayers have every reason to prefer that the Companies should carry out the Welsh scheme rather than for the County Council to do it. The Council would have to load the account with a redemption fund. Whatever loss may arise, they will throw upon the rates; and that there will be a loss, to be defrayed by a rise in the charge for water, all parties are agreed, to which may be added a tax on the ratepayer after he has paid something extra as a consumer. The question is whether all these burdens can be thrown upon the Companies; and the answer is that assuredly they will have to bear them if they carry out the Welsh project. Perhaps it comes within the range of finance for some kind of aid to be given to the Water Companies in providing funds for so large a scheme. Such assistance would, for fiscal reasons, be a better expedient than letting the expenditure of £15,000,000 or £20,000,000 rest with the County Council. The idea that the Council would ever realize a profit on the water supply, which would go in relief of the rates, appears but a forlorn hope when we look at the fact that, exclusive of income-tax, the Companies are now paying £236,000 per annum in the shape of rates and taxes. When the Council take the place of the Companies—if ever they do—will anything better than this be available for the benefit of the ratepayer?

Sir John Lubbock's plan for dealing with the water supply of the Metropolis consists in the nomination by the Local Authorities of two Directors to serve on the Board of each of the Water Companies in the interests of the ratepayers. He considers that this plan would secure the economical management of the undertakings. We are more inclined to think that it would cause friction and embarrassment, and would tend to create a feeling of divided responsibility. A properly constituted Water Trust would be better, though Sir John thinks otherwise. Mr. Whitmore, M.P., who gave evidence after Sir John Lubbock, declared against a Water Trust by saying that the creation of a new elected public authority would be intolerable, and it would be most inconvenient to increase the number of local elections. With respect to purchase, he considered it was not in the interest of the public that a large industrial undertaking like that of the Water Companies should be owned and managed by a political body such as the County Council was just at the present time. Mr. Whitmore is able to testify on this point, being himself an Alderman of the Council. In the next place, there is the financial objection, of which Sir John Lubbock gave further proof by stating that, if purchase took place, the mere lowering of the water-rates to the level of the rates of the four Companies who charged the least, would of itself create a loss of £160,000 per annum. The "Pall Mall Gazette" considers that the figures brought forward by Sir John are "calculated to give pause to the "most ardent advocates of purchase." On the whole, it seems demonstrated that the public have reason to object to any change, except it be the formation of a Water Trust, or unless the Companies at some future time undertake to bring a supply from Wales, when the situation would necessarily undergo a change of a most vital character. That the Companies should entertain anything so vast, after so large an expenditure in other directions, including a million on the Staines scheme, would seem very unlikely. Yet the public would have no reason to object, seeing that any consequent damage must fall on the shareholder. As for the recent works, they will long be wanted, and perhaps will always be useful. It may be said that we are looking a long way ahead, and that the Welsh supply is too far off in order of time to be worth serious consideration. Yet it can hardly be denied that the attitude of the Companies in respect to this subject has an immediate effect. The people of London should be so informed as to perceive that the County Council are not essential to the Welsh supply, and that if the Council obtain full command of the supply of water to London, a heavy financial burden will most certainly fall on the ratepayers; this being the case even if Wales were left out of the account. Our contemporary "London," considers that the Companies would not have any difficulty in getting the capital requisite for the Welsh scheme, but argues that the consumers would have to pay more than if the work were carried out by a Municipality, because the shareholders would require a 10 per cent. return. The shareholders might wish for such a dividend; yet only some of them get it even now. But in no respect is the argument conclusive; and facts point the other way.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 738.)

THE week just closed was a very dull one on the Stock Exchange; and it finished at its worst—quite as gloomy as the weather, which itself has sometimes a depressing influence on markets Of course, the extremely unsettled condition of political affairs was the dominant factor; and Saturday's intelligence imparted a feeling of keen apprehension. Bad as this was, the fear that it might involve difficulties in the approaching settlement made things worse; so that motors for depression acted and reacted on each other. Prices, therefore, have had a severe drop—indeed, in some cases they are almost nominal, as any attempt to sell would probably knock the bottom out of them altogether. The Money Market was easy at the start, but it soon hardened; and borrowing this week is not likely to be an easy matter. The Gas Market has been a sufferer like the rest; for depression spreads sympathetically on every side. The fall, however, has not been considerable; and moreover, as it appears to have touched some of the choicest issues, it would seem to be quite unconnected with any intrinsic cause of weakness. Business in Gaslight "A" was very quiet at first; and the price held firm. But selling then set in; and the figures fell away, until on Friday one bargain was done "specially" at 288. The quotation showed a fall of five points at the close. Among the secured issues, the "B" and all the 10 per cent. preferences, failed to hold their ground; but the "H" kept very steady through numerous transactions. South Metropolitan opened rather weaker, changing hands at 136. It caught up on Thursday to 139; but it was scarcely firm at that. A few "special" bargains were marked in Commercials at low figures; but the prevailing disposition was to wait for the dividend next week. There were very few transactions in the Suburban and Provincial undertakings. But offers to sell Crystal Palace lowered the price a little; and Brentford preference also was lower. Movements in Continentals were irregular. Union held steady; Imperial advanced a point; but European, for some reason or other, receded. Among the rest of the Gas undertakings, there was not any incident of note. The Water Companies were about as quiet as usual. The tendency was not good; and a few issues had a fall. East London are about to advance their rate of dividend from 7½ to 8 per cent.

The daily operations were: Gas opened very listlessly on Monday; and a dull tendency prevailed. Gaslight "A" fell 3; and South Metropolitan, 1. Tuesday was not much more active; but quotations remained steady. In Water, West Middlesex receded 2. Much greater activity, especially in Gaslights, set in on Wednesday. Brentford preference fell 2; but Imperial rose 1. In Water, West Middlesex fell 2 more. Transactions relapsed into quietude on Thursday. In Gaslights, the "B" fell 2; and "C," "D," and "E," 2¼. New River debenture was 2 lower. Friday brought no recovery either in activity or in tone. Gaslight "A" and Crystal Palace fell 2 each; European, 1; and ditto part paid, ½. Lambeth 7½ per cent. fell 2. Saturday was without any feature in Gas. In Water, Southwark "D" was put back 8.

ELECTRIC LIGHTING MEMORANDA.

Electric Lighting at Sheffield—Reply to Sir F. Mappin—A Newspaper Letter on Gas v. Electricity in London.

IT is not often that one has the pleasure of reading so thoroughly reasonable and fair an address from the chair of an electric lighting company as that delivered by the Lord Mayor of Sheffield (Mr. Alderman Franklin) at the last meeting of the Sheffield Electric Light and Power Company. We publish in another column a report of this speech, and also the proceedings in regard to the agreed transfer of the Company's undertaking to the Corporation. At the recent meeting of the Sheffield United Gas Company, the Chairman, Sir Frederick T. Mappin, made one of those aggressive speeches for which he is known far beyond the city, attacking the local electric lighting on the score of its dearness in comparison with gas. It was the turn of the Chairman of the Electric Lighting Company next; and well did the Lord Mayor meet the assault delivered from his own ground by his brother Alderman. In truth, electric lighting has done very well in Sheffield; and as a natural result the town is faring very well at the hands of the Electric Light Company. The Corporation decided to give private enterprise the chance of trying the commercial experiment of central station supply; and now the price of current is to be brought down to 4d. per unit as from the end of the present month. This is a result on which the Corporation, the consumers, and the electric lighting interest, both financial and technical, are to be congratulated. The decision to acquire the undertaking at this time is a very rational one; and the price to be paid is not high in the circumstances. The chief point to be considered, of course, is the low price at which the undertaking can supply current and pay a certain 10 per cent. dividend. This datum being ascertained, the Corporation are probably very well advised in taking over the

undertaking before it grows any bigger. They wish to come in with the flowing tide, and not wait until it is high water. This is wise; for there is probably plenty of room in Sheffield for an electric light undertaking twice or thrice the size of the present establishment. That, as we have always maintained, is the only criterion of value for such concerns.

Where the Lord Mayor of Sheffield "rounded" most effectively upon Sir F. Mappin was with reference to the alleged extravagance of the Corporation in lighting the municipal buildings with electricity. Sir Frederick ventured to compare two things not strictly comparable—the cost of electric lighting for the new Town Hall with that of gas lighting for the old public offices which this gorgeous structure has superseded. Here was the Lord Mayor's opening; and he charged home through it with something that sounded very like a shout of exultation. It was quite fair and permissible; but, after all, if it is the fact that whereas the work of certain municipal departments used to be transacted at a cost for artificial lighting of less than £40, the same departments run up a bill for electricity of £210, the alteration cannot be characterized as economy. The Lord Mayor was really upon sounder ground when he declared that "the fact remained that those who became customers for the electric light had remained customers. Tradesmen and others knew their business perhaps better than any gas company or electric light manager could teach them. They knew the value of a penny or a pound in their expenses as well as anybody, and they would not pay more for a thing than it was absolutely worth to them." This is the soundest of sound business common sense. Of course, there is a market for electric lighting in Sheffield and every other town of sufficient importance. When the fact of the existence of such a market is established, the only proper thing to do is to serve it in the best and cheapest way possible under the local conditions. It is exactly the same with a gas undertaking. The worst misfortune that could come to a business of either kind would be to fall into the hands of incompetent administrators who should think themselves permitted to charge what they liked for their commodity because the public are bound to go to them for it. Sheffield is fortunate in having real, live business men at the head of both the electricity and gas undertakings. So long as this condition obtains, it will not matter to the public one jot whether the property belongs to the ratepayers or to private proprietors. Actually, we believe, with the recently announced reductions, Sheffield will share with Newcastle-upon-Tyne the advantages of having the cheapest electricity and gas in the United Kingdom.

A letter, which is calculated to arouse very mixed feelings in the breast of the instructed reader, recently appeared in the "Pall Mall Gazette," under the heading "Gas *v.* Electricity." It dealt with the actual position of gas and electricity supply in London, as revealed by the balance-sheets and the speeches of Directors of the Metropolitan Companies "with The Gaslight and Coke Company in the van and the Chelsea Electricity Company bringing up the rear." The conclusion arrived at by the writer, after reviewing the situation in the light of this official information, is that "in the case of the electricity supply concerns, the record is one of continuous and rapid progress, increasing dividends, and good prospects; while the gas companies appear at last to have reached the point in their prosperous career when the expansion of the sales of gas to which we have been accustomed for so long has attained its maximum." The writer evidently means to imply that the word "maximum" here is to be taken in the sense of "high-water mark." Otherwise the prospect would not be an alarming one for the gas industry, as he goes on to argue that it is—of course, upon the showing of The Gaslight and Coke Company. Like most people who are not under the hypnotism that appears to be wielded across the directorial table by the heads of the "*quasi* Department of State" seated in the Horseferry Road, the writer thinks that the state of Chartered affairs ought "to give the proprietors of the Company grave cause for concern." When he proceeds to argue that it is the encroachment of electric lighting that prevented the Directors of the Company from earning last year the full dividend they recommended, he enters upon debatable ground. It is not true that the increase in the sale of gas for the past year in the Chartered district was "trifling;" though it might be argued that but for the advance of electric lighting it would have been greater. The writer accuses the Chairmen of the London Gas Companies of not taking the progress of the electric light "seriously." But it is not clear how they could have "taken it" differently, having regard to the nature of things.

"The Management of Gas Cooking-Ranges" is the title of a very tastefully got-up little pamphlet which Messrs. Fletcher, Russell, and Co., Limited, have just issued. It opens with a few remarks on the cause and the remedy for waste of gas in cooking, and then gives some valuable advice to users of ranges. The pamphlet can be hung near a gas-stove for ready reference.

Spons' Architects' and Builders' Price Book.—We have received from the publishers of the above-named work (Messrs. E. & F. N. Spon, Limited) a copy of the 25th edition, which has lately appeared. The Editor, Mr. W. Young, has in recent editions arranged the matter in alphabetical sequence—thereby facilitating reference; and has given attention to electricity and the provision of electric light installations.

THE HOME OFFICE WATER-GAS INQUIRY.

THE short article on this subject in last week's "JOURNAL" was prepared from fragmentary information gathered from different sources; and therefore it is satisfactory to learn from an official quarter that it was substantially correct. It appears that we were wrong in applying the term "Commissioners" to the gentlemen appointed to conduct the inquiry; their proper denomination being "Departmental Committee." They have no power to compel the attendance of witnesses or the production of documents at their sittings; they only "invite" persons to give evidence. But there is no doubt that their investigation will be thorough and complete. The two scientists on the Committee (Dr. Haldane and Professor Ramsay) know all that is worth knowing regarding the properties of water gas—in fact, the former is particularly well versed in the question of carbon monoxide poisoning, he having, as our readers are aware, made it the subject of careful study some few years ago in relation to colliery explosions. His knowledge will, therefore, be of material assistance to the Committee. Ample evidence is also forthcoming from engineers who have had practical experience of the manufacture and distribution of carburetted water gas; but there is some doubt as to whether the opponents of the system will be able to make quite so strong a show as the supporters. The sittings of the Committee have been suspended for a short period—chiefly on account of the Easter holidays. Meanwhile, however, time is not being lost, as the interval is being devoted to the collection of particulars of cases of alleged carbon monoxide poisoning—such as that at Liverpool on the 12th inst.; and the possession of these details will put the Committee in a better position for examining their witnesses. We are unable at present to give the names of the witnesses who have been or will be called; and we may not be in a position to do so before the issue of the Committee's report, which, it is probable, will contain not only their names, but also a summary of their evidence.

With regard to the remark last week, suggesting that the appearance of certain Gas Bills now before Parliament containing clauses covering the unrestricted supply of carburetted water gas has had some influence in moving the Secretary of State at this particular time, we are informed that this is not so, as arrangements for the inquiry had been completed before the Bills for this session were deposited. Nevertheless, the inquiry will have an important influence upon at least two of the Bills which are now before Parliament, and in which there are provisions referring to carburetted water gas. One of them is the Halifax Corporation Bill, in clause 29 of which powers are specifically sought for the manufacture and supply of this gas. In a report (which we have now before us) upon this Bill, the Secretary of State for the Home Department, dealing with the clause mentioned, says: "It has been represented to the Secretary of State that the use of water gas may be attended with serious danger. The gas is highly poisonous on account of the large proportion of carbon monoxide which it contains, and grave consequences may attend an escape or leakage. In the opinion of the Secretary of State, if powers are given by Parliament for the manufacture and supply of this gas, it is a matter for serious consideration what conditions should be attached in the interests of public safety. The Secretary of State, after consultation with the Local Government Board and the Board of Trade, has appointed a Committee to inquire into, and report upon, the dangers attending the manufacture and use, for heating, lighting, and other purposes, of water gas and other gases containing a large proportion of carbonic oxide. He submits that, *pending the completion of the inquiry and the consideration of any recommendations that the Committee may make, no facilities or powers such as those contained in this clause should be given.*" We have italicized the final sentence in the report in order to draw special attention to its signification. It plainly indicates that legislation on the subject will be controlled by the advice offered by the Committee as the result of their investigation; and consequently, in Bills promoted in the future, all clauses dealing with water gas will have to be drafted accordingly.

MANURIAL VALUE OF SULPHATE OF AMMONIA.

THERE is reason to hope that the attention of British farmers is at last being directed to the value of sulphate of ammonia as manure. In addition to the testimony recently given as to experiments on the Earl of Rosebery's home farm, there has been published the result of an interesting series of tests carried out in Devon as to the value of certain manures. The trials took place under the auspices of the County Technical Education Committee, with the assistance of Mr. A. H. Whipple, M.A., B.Sc., the State Instructor in Science and Agriculture. It was desired to discover what food-materials were lacking in the soil at various centres, and in what form plant-food could be best supplied. The experiments seem to have been conducted in a systematic and thorough manner. They took place on seventeen farms situated in different parts of the county. The crops grown on the various experiment plots were mangolds, potatoes, swedes, and turnips; and the manures used were

nitrate of soda, guano, bone, superphosphate, kainit, sulphate of ammonia, and farmyard manure—alone or together with carefully recorded quantities. The soil was analyzed in most cases, and the results, together with those of the experiments, are recorded in a pamphlet issued by the Committee. It is stated, with regard to swedes and turnips, that sulphate of ammonia gave "uniformly good results throughout the experiments, and certainly deserved to be in more general use than it is at present." As to potatoes, it is said that 2 cwt. of sulphate of ammonia put in with the seed gave a heavier crop than when the same quantity was applied in three dressings; and it also gave a better average return than 2½ cwt. of nitrate of soda, whether the latter was applied with the seed or in three separate dressings. Under the head of mangolds, there is a similar note as to the application of sulphate of ammonia with the seed. The explanation is offered that the nitrogen of sulphate of ammonia cannot be washed out of the soil until it has been converted into nitrates; and as this change takes place periodically, the plants make use of it as it is prepared for them. Those who are endeavouring to promote the use of sulphate of ammonia by English farmers may find other useful information in this report.

THE COKE-OVEN SYSTEM OF CARBONIZATION.

It may be remembered that, in the course of the Inaugural Address of Mr. John Young to the Midland Association of Gas Managers last year, he referred to the subject of the disposal of coke. He pointed out that, while the production continued to increase, the demand did not keep pace with it; and consequently prices were receding year by year. He thought the brighter prospects in the iron trade might help gas managers a little; but he was forced to acknowledge that the greater production of good metallurgical coke from ovens specially constructed at very moderate prices, forbade any optimistic prophecies in this direction. Mr. Young referred to the important paper read by Mr. Charles Hunt before the Institution of Gas Engineers in 1896, in which he described the Semet-Solvay coke-ovens erected at the works of the Brymbo Steel Company at Wrexham. In the course of his paper, Mr. Hunt related how, when on a visit to Belgium with the Iron and Steel Institute in 1894, he was enabled to realize, by actual observation, the large scale on which the recovery of residuals was being pursued there in connection with the manufacture of coke for metallurgical purposes; and he thought it was but natural to contemplate what might be the effect upon the values of gas residuals of an extension of the system in this country. He put a very pertinent question as to how the system ought to be regarded—whether as a possible ally or as an intractable competitor. At the time Mr. Hunt read his paper, plant was being erected at Halifax (Nova Scotia) for the purpose of supplying the city with illuminating and fuel gas, and at the same time producing metallurgical coke. Believing the subject to be of special interest to the members of the Midland Association, situated as most of them are in manufacturing districts where the coke they produce is largely used for metallurgical purposes, and where an improvement would, it was supposed, ensure a wider and more remunerative market, Mr. Young gave a brief description of the plant (this will be found in the "Journal" for March 2, 1897, p. 465), and suggested the advisability of erecting similar plant there as a question worth serious consideration. The subject was not allowed to drop; for Mr. Young's successor—Mr. J. T. Lewis, of Wellingborough—alluded to it in his Inaugural Address at the recent meeting of the Association (*ante*, p. 462). Fully appreciating the importance of Mr. Young's suggestion, he endeavoured to procure some additional particulars of the Halifax experiment to lay before the members; but he was unable to obtain them. They have, however, since come to hand; and Mr. Lewis has placed them at our disposal, in order that his colleagues in the Association, and readers of the "Journal" generally, may be in possession of this additional information.

Dealing first with the Halifax installation, Mr. Lewis had heard that it was a failure, as the Company could only supply fuel gas at 1s 10d. per 1000 cubic feet; and the latest advices he has received bear this out. The plant consisted of ten Slocum recuperator ovens fired with Mond producer gas, with the necessary condensing, scrubbing, purifying, and storing apparatus. The original intention was to extract the benzol from a portion of the gas, and sell the latter for fuel purposes, enriching a sufficient quantity with the benzol for sale for illumination. This, however, was never accomplished, as the ovens, owing to their defective construction and the inferior material used, were not a success, and are now being replaced by others of the Semet-Solvay type. Mr. Lewis is informed that this is a good oven, and in its proper sphere does excellent work; but it is considered to be out of its sphere in a gas-works. The fallacy of using a coke-oven in ordinary gas-works is this—that the oven was designed to make metallurgical coke, and not gas; and the gas produced, or from 65 to 80 per cent. of it, is used to heat the ovens, leaving for sale only from 20 to 35 per cent., and this of inferior quality, being only about 10-candle power at best, unless the first distillations are taken off separately, when it is possible to obtain 20 to 21 candle gas. The writer says the only advantage of this system over a retort system is the fact that by it a metallurgical coke is obtainable, that the cost of labour for carbonizing is reduced 15c. to 18c. per ton, and that there is a saving of 375 to 400 lbs. of coke or coal used as fuel per ton of coal carbonized. But this "saving" is, he says, effected at enormous cost, as 70 to 80 per cent. of the most valuable product from a ton of coal is used simply to fire the benches. If producers are used, the interest on capital and working expenses more than counterbalance the benefits derived. It seems to the writer an utter impossibility to utilize an oven as at present designed to displace an ordinary retort, except in certain localities where there is an excellent demand for hard coke, tar, ammonia, and a low quality of gas, and where the quantity of gas wanted is uniform all the year round, as there is no elasticity in a coke plant. He says that if an oven were designed that could be fired either with solid fuel or the surplus gas as the case required, and with a double set of hydraulic mains and a duplex condensing, scrubbing, and purifying plant, then in localities where coal is cheap and coke is in demand, a very profitable business could be built up both for fuel and light. The writer has such an oven designed; but he has so little faith in it that he has not even entertained the idea of ovens in designing a plant for the city in which he is at present located.

The following additional particulars in regard to the Halifax plant, furnished by a practical manager fully acquainted with the installation, were subsequently received by Mr. Lewis. The writer says that the coke-ovens struggled along for some time; but the running of them had been a disastrous failure—or rather series of failures—from the time they were first lighted till they were extinguished. They were built under very adverse conditions—the weather being very wet; and this must have badly washed out the jointing of the brickwork. After some considerable time, and by an alteration of the flues, &c., they managed to make coke; but the quality was so bad that, after one trial, hardly anyone would use it. The slack coal (unwashed) was of an inferior kind, and consequently the sale of coke was interfered with at the very start. Then the Mond process did not give satisfaction. Sometimes the results were good; but often they were the reverse. No dependence could be placed on it; and the heat had to be maintained by using the oven gas. The stoking was difficult. The real cause of all these troubles the writer believes was the kind of coal used, as coke breeze gave considerably better results, and when a coal from another part of the province was tried, the results were more satisfactory—in fact, better than had been claimed in England, at least, as far as the heating power of the gas went. The quantity of ammonia could only be ascertained by calculation, as the acid tower was never in such continuous operation as to enable them to determine any result. Shortly after starting, the ovens leaked so badly that they had to be cooled down again, and the joints were picked out and packed with asbestos wick and retort cement, after which they were much better. Then, owing to the leaky doors, a new one had to be designed and substituted, which was a great improvement. Thus the summer passed away. Then the ovens began to break down, owing to the bad quality of the fire-clay materials used; consequently, shortly before the new retorts were ready, both the producer and the ovens were allowed to cool down, and for a short period the whole of the gas was made at the old works. At this time it looked as if the scheme of oven coke and cheap fuel gas would soon be abandoned, and things changed into an old-fashioned coal-gas works. But it turned out otherwise, as arrangements were made to replace the old ovens with ten of the Semet-Solvay type, and effect certain improvements in the handling of the coke and coal. In the writer's opinion, the business cannot pay, and will eventually have to be abandoned. The cyanides and benzol features are given up; and instead of making sulphate of ammonia they are commencing to concentrate their liquor, and ship it all away to Detroit. The works are very incomplete. The market for the coke has to be made; and he is doubtful if one can be made for it at a paying price. Though the results at Halifax were so unsatisfactory, it is possible that, had the work been carried out in England by people having more practical experience, they might have been much better. The experiment, however, seems to show that it will be some time before ordinary gas-retorts are displaced by coke-ovens.

It will have been noticed that the ovens originally constructed at Halifax are being replaced by others of the Semet-Solvay type. It will therefore be of interest to give the views of Mr. J. H. Darby (who has had so much experience with these ovens at Brymbo) on their capabilities, as expressed in the course of a reply he has sent to some questions addressed to him by Mr. Lewis. He says a Semet-Solvay coke-oven plant to deal with 100 tons in 24 hours would require about 25 ovens. The cost of plant for coking, without particular reference to the quality of the gas, and where the gas is of little value except for raising steam, &c., is not a good guide to the gas manufacturer. He estimates that an installation of this number of ovens, with plant for the manufacture of sulphate of ammonia, including buildings, boilers, &c., in proper working order, would cost about £15,000. A 50-oven plant—that is to say, one equal to dealing with 200 tons in 24 hours—would cost considerably less per unit of consumption. Mr. Hunt, in his paper, gave 9689 cubic feet of gas as the yield per ton of dry slack; being "equivalent to 9387 cubic feet after passing the purifiers." Mr. Darby thinks that Mr. Hunt's result was rather low. At the candle power he

named, he believes Mr. Hunt would obtain 10,000 cubic feet of gas from the washed slack of the Brymbo district. This is from subsequent experiments made with a station meter measuring the whole of the production at Brymbo. When the ovens are working regularly with washed slack, Mr. Darby says an illuminating power of 15 candles can be depended upon; but to maintain this regularity of working, there would be required more duplicates in the way of discharging rams and other apparatus than it is necessary to keep when coke only is contemplated, and when it is not a very serious question if the quality of the gas falls off. His opinion is that a recovery plant for the production of gas should be specially designed for the purpose by a competent gas engineer in conjunction with a person acquainted with coke-ovens. With regard to the labour involved, when coking 100 tons per 24 hours, the cost will amount to about 11½d. per ton of dry coke. As to wear and tear, Mr. Darby says that he has ovens at work at the present time which have been going for twelve years, and contain the same side walls or channel blocks that were originally inserted. The life, however, of these blocks greatly depends on the quality of the fuel used—that is, if it contains an undue quantity of water, introduced by washing the slack, the blocks deteriorate very much more quickly than if the fuel is comparatively dry, and does not contain more than from 4 to 5 per cent. of moisture. He states that the cost of repairs in the Semet-Solvay oven is not considerable, as whenever these are needed one oven can be taken off and repaired while those on either side are in full work. His conclusion is that the plant is capable of being adapted for gas-making purposes, provided an installation is designed under the conditions previously indicated.

ACETYLENE EXHIBITION AND CONGRESS AT BERLIN.

THE first acetylene exhibition at Berlin was opened on the 6th inst., in accordance with the programme referred to in these pages (*ante*, pp. 76, 339, 583). Dr. H. Lux, one of the Editors of the "Zeitschrift für Beleuchtungswesen," makes some interesting comments on the exhibits in the number of that paper dated the 20th inst. He observes that acetylene generators in which the supply of water to carbide was under control far exceeded in number those in which a regulated addition of carbide was made to water. Generators of the type which preponderated at the exhibition can be far more easily designed than those of the less common of the two main types of generator. Dr. H. Lux refers briefly to a few of the generators exhibited, but promises a more comprehensive notice of them later. Burners were second only in importance and interest to the generators; and all types were represented, from the original Bray to the latest so-called smokeless burner. On these also Dr. Lux promises a detailed report shortly. Several exhibits of accessories to the electric furnace and carbide manufacture were made; and samples of calcium carbide from some very diverse sources were shown. An acetylene motor was exhibited by a Dresden firm.

From the "Journal für Gasbeleuchtung" of the 26th inst., we learn that the official catalogue gave the names of 60 exhibitors, of whom 30 showed apparatus for generating gas from carbide. Few of these generators, however, were seen at work, as the regulations referred to on p. 583 of the "JOURNAL" precluded the refilling within the exhibition hours. Our German contemporary considers that the public safety would have been imperilled had several of the generators exhibited been set in action. It calls attention to the urgent need for the better purification of acetylene gas if it is to make a bid for public favour, and states that the air of the exhibition building was in the evenings thick with a dense cloud of phosphoric acid derived from the phosphuretted hydrogen in the acetylene which was consumed for the illumination of the building. Persons with delicate chests were unable on this account to remain in the exhibition after dusk.

A congress of those interested in the acetylene industry was summoned by the German Acetylene and Carbide Association, and opened on the 7th inst. It was attended by most of the exhibitors, both local and foreign; and the sittings, of three hours' duration daily, continued for a week. Dr. Max Rosenkranz, Dr. Lux's co-Editor, gives a report of the proceedings. He considers that they scarcely comported with the procedure commonly associated with a gathering dignified by the title of "congress." The daily meetings, however, served excellently to promote exchange of ideas among the technical men present. In the communications made to the congress, and in the discussions thereon, practical experiences were less in evidence than observations based on theory; and the tendency to suppress the publication of practical information was clearly fostered in certain quarters by a disposition to seek commercial advantage, in trade secrecy. This disposition Dr. Rosenkranz much deplores since it will only tend to restrict the development of the acetylene industry. A resolution was passed that the Committee of the Association should inquire into certain technical questions, and report thereon to the congress which will be convened at Buda-Pesth in about a year's time. Among these questions may be mentioned the impurities in carbide, the best means of purifying acetylene, the construction of generators, and the most suitable services for the gas.

Professor J. Vértess, of Alba, in Hungary, was the author of a communication dealing with "The Analysis of Acetylene and Carbide." He recommended the estimation of the yield of gas from carbide by weighing the carbide in concentrated sulphuric acid, which is without action on it, and then adding water drop by drop, and collecting the gas evolved in a graduated holder. In the discussion, objections were raised to this method, and it was asserted that the sulphuric acid attacked the acetylene as it was developed. Phosphuretted hydrogen was best estimated, according to Professor Vértess, by Lunge's method, which consists in the formation of ammonium-magnesium phosphate. Dr. N. Caro, of Berlin, considered that solid purifying agents were far less efficient than liquids, especially in the case of phosphuretted hydrogen, which is the most dangerous impurity of acetylene. He thought that the gravimetric method of estimating the yield of acetylene from carbide recently proposed by Dr. H. Bamberger was quite free from objection. This system, and a still more recent volumetric method devised by the same analyst, will be described shortly in the "JOURNAL."

Professor A. Rossel, of Soleure, then gave the results of some experiments with uncompressed mixtures of oil gas and acetylene. The most favourable mixture contained 25 per cent. of acetylene—a proportion which has also been preferred for compressed gas. The ordinary oil-gas burner was found to give a light of 22 candles by the consumption of 1·95 cubic feet of oil gas or of 1·06 cubic feet of the mixed gas per hour. The cost per candle-hour was stated to be 30 per cent. lower with the mixed gas than with oil gas. Professor Rossel also referred to the effect of magnesia on the quality of carbide. When lime containing magnesia is used for the manufacture, the magnesia does not form magnesium carbide, but is reduced to magnesium. When the mass is withdrawn from the furnace, the magnesium thus produced combines with atmospheric nitrogen to form magnesium nitride, which yields ammonia when it reacts with water. Therefore, if lime containing much magnesia is used in the manufacture of calcium carbide, the latter will yield acetylene contaminated to a very large extent with ammonia.

Dr. Billwiller, of St. Gall, Switzerland, read a communication on burners for acetylene, with special reference to those of the air-injector type. Particulars of Dr. Billwiller's burner of this pattern are given in the paper on "The Efficiency of Acetylene Burners" which will be published in next week's "JOURNAL." In the course of the discussion on this communication, Herr Mendel, of Vienna, recommended the use of small Welsbach mantles with a non-luminous acetylene flame. The consumption of acetylene with these mantles amounted to from 0·099 to 0·124 cubic foot per 10 candle-hours. Dr. P. Wolff, of Berlin, thought carbide which yielded hydrogen along with acetylene was likely to be very useful; and he recommended the employment of an acetylene hydrogen mixture.

Herr Armin Tenner, of Berlin, gave a retrospect of carbide manufacture, and some hints on the selection of the raw materials and the construction of the furnaces. He computed that a carbide works having a boiler installation of 2000-horse power could be erected at the present time in Germany, and so worked that interest at the rate of 40 per cent. on the capital outlay could be secured. He mentioned an invention by an American, named Price, which made the life of the electrodes in carbide furnaces four times as long as it was formerly.

A communication by Professor Vivian B. Lewes, on a process for the enrichment of water gas by acetylene, was read by Dr. Ludwig. In the discussion on this communication, Herr Tenner remarked that the process might prove valuable for the production of gas for the lighting of vehicles; but Dr. Stern thought that pure acetylene was better than enriched water gas for such purposes. Dr. Wolff and Herr Silbermann stated that they saw no special advantages in the Lewes gas. The congress concluded with some remarks by Professor Göttig on a combination of phosphuretted hydrogen; but they appeared to have no special bearing on the acetylene industry.

The Informal Meeting of Scottish Gas Managers.—We learn from the Convener (Mr. Alex. Yuill) that the fifteenth annual "informal" meeting of Scottish Gas Managers will be held in the Station Hotel, Glasgow, on Wednesday, the 6th prox., under the presidency of Mr. Hubert Pooley, of Dunfermline. No papers will be read; but, as usual, questions affecting the gas industry will be submitted for discussion. The President (Mr. T. Wilson, of Coatbridge) and the Officers and Committee of the North British Association will take part in the proceedings.

Burton on "The Water Supply of Towns."—We have received from Messrs. Crosby Lockwood and Son the second edition, revised and extended, of Mr. W. K. Burton's well-known work on "The Water Supply of Towns and the Construction of Water-Works." The author is Professor of Sanitary Engineering in the Imperial University, Tokio, and Sanitary Engineer to the Home Department, Japan. His book first appeared four years ago; and as there has been but little advance in the science and art of designing and constructing water-works since then, the contents of the present volume do not differ very materially from those of its predecessor. The text has, however, been carefully revised, and a substantial amount of new matter added. The most important addition will be found in Appendix II., where the subject of "Sand Dunes and Dune Sand as a Source of Water Supply" is dealt with by Mr. J. de Rijke, whose wide knowledge of hydraulic engineering rendered him specially well qualified for the task. There are numerous plates and other illustrations throughout the book.

OBITUARY.

It is with regret that we have to record the death, on the 16th inst., of Count S. J. Van Limburg Stirum, Agent of the Imperial Continental Gas Association at Haarlem. Deceased had been 25 years in their service at Haarlem, where he was well known and deservedly popular; and the Association lose in him a devoted and valuable representative whom it will be difficult to replace. Count Van Limburg Stirum was also interested in two other undertakings—the Nederlandsche Maatschappij ter bevoordering van Nijverheid, of which he was Vice-Chairman, and the Haarlem branch of the Alliance Française, of which he was the President. He was formerly a lieutenant of Hussars, and was an officer of the Order of Orange-Nassau.

It is with regret that we have also to announce the death, on Monday last week, of Mr. J. S. Nicholls, Manager of the Darlington Corporation Gas-Works. Mr. Nicholls had been for some time past in a state of ill-health, and for about three weeks had been confined to his house. During the evening of the day preceding his death, he was seized with an apoplectic fit, from which he never recovered. The deceased gentleman (who was in his 56th year) was a native of Staffordshire; and from his earliest days he was associated with the production of gas. He was Engineer and Manager to the Southbank Gas Company previous to succeeding to the managership of the Darlington Gas-Works, rendered vacant by the departure of Mr. William Smith. Up to the time of his death, Mr. Nicholls faithfully and successfully discharged his duties in the interests of the town, and to the entire satisfaction of the Corporation—indeed, it is thought that his strict and constant attention to duty has more than aught else conduced to his premature end. He was a man of homely disposition, much respected and esteemed by those who came in contact with him; and his untimely death will be deeply regretted.

PERSONAL.

Mr. J. Naismyth, of Dunkeld, has been appointed Manager at Laurencekirk, in place of Mr. R. Young, who has gone to Lockerbie.

Mr. C. J. Lake, the Secretary of the Stoke-on-Trent Corporation Gas Department, has just been appointed Borough Treasurer and Accountant.

We are pleased to learn that Mr. William Carr, Engineer of the Stalybridge Corporation Gas-Works, has returned home much improved in health by his trip to the Canary Islands.

Mr. E. Howarth has been appointed Manager of the Milnthorpe Gas-Works, in succession to Mr. J. W. Wynne, who has gone to Ambleside.

The removal of Mr. Matt. Dunn from Selby to Goole has already been notified in the "Journal." He will be succeeded by Mr. W. J. Mott, who has been with Messrs. Jonas Drake and Son, of Halifax.

Mr. J. Dougall, of Hoylake, has been selected to fill the position of Engineer and Manager of the Isle of Thanet Gas Company, rendered vacant by the appointment of Mr. H. H. Jones as Mr. Freeman's successor at Wandsworth.

We regret to learn that Mr. J. Whyte, the Engineer and Manager of the Seaham Harbour Gas-Works, last Tuesday met with a serious accident. Some repairs were being carried out with the steam hoist, which became fixed; and in trying to ease it with a lever, it went up without the least warning, jamming Mr. Whyte by the right leg against the top platform. Had the planks not given way, he would undoubtedly have had his leg taken off. Though the limb is much bruised and sprained, Mr. Whyte is progressing favourably.

The occasion of the annual meeting of the Nottingham Section of the Society of Chemical Industry was taken advantage of on the 19th inst. to give a complimentary dinner to Dr. Frank Clowes, as a farewell from the members on his leaving Nottingham to take up the duties of Chemist to the London County Council. Sir John Turney presided; and the company numbered representatives from almost every town within the district covered by the Section. Mr. J. C. M. Paton proposed "Our Guest," and drew attention to the important work Dr. Clowes had done for so many years in the University College, Nottingham. As regarded his connection with the Nottingham Section of the Society, it could be said that Dr. Clowes was the founder; and the Section had indeed been fortunate in having such an enthusiastic worker to foster it during its early years. Dr. Clowes, in returning thanks, described how the Section was originated in 1885, some few years after the formation of the parent Society. Referring to his election to the presidency of the Society, and his removal to London, he said the circumstance enabled him to give that attention to the duties of the office which it would have been impossible to do had he been still engaged with his professional duties in Nottingham. Mr. F. J. R. Carulla expressed the general regret that was felt at the loss the Section had sustained by the removal of Dr. Clowes to London; but he said it was mitigated by the knowledge that he had been called to fill one of the most important posts that could fall to the lot of a scientific man—namely, to look after the health and welfare of the inhabitants of the Metropolis of the world.

NOTES.

Heat Economies at Creusot.

At the Creusôt works of Messrs. Schneider, one of the economies practised is the firing of the boilers required for all purposes by what are generally waste sources of heat. All the coal-fired boilers at one time in use have been replaced by a peculiar pattern of tubular boilers heated entirely by the waste gases from the blast-furnaces. The gases are ignited in a fire-brick combustion chamber placed in front of the boiler, which is practically a long cylinder filled with tubes in the locomotive style. The air for igniting the gas is first heated by being caused to circulate through passages in the walls of the combustion chamber. The tubes are cleaned by a blast of compressed air. In these boilers, 36 cwt. of water per hour is evaporated by the heat of blast-furnace (that is, common producer) gas, burnt at the rate of about 1060 cubic feet per minute. The feed water is previously warmed to 90° or 95°C. At the same works, extensive and costly experiments have been made with different patterns of coke-ovens. For some years vertical coke-ovens of the Appolt and Bauer types were used at Creusôt; but horizontal ovens were found to be preferable, on account of the nature of the coal treated—being a mixture of poor coal with a local anthracite. The volatile bye-products of this mixture were insignificant; but the waste heat was considerable, and this is now utilized for steam raising. It is calculated that, by the arrangement of coke-ovens and boilers now adopted, for every pound of coal charged into the ovens an equal weight of water is evaporated in the boilers, without interfering in any way with the operation of coking. The arrangement has been illustrated in "Engineering" in the course of a detailed account of the Creusôt establishment.

The Utilization of Exhaust Steam.

In the March number of the "Engineering Magazine," Mr. Bryan Donkin has an essay on the economical utilization of exhaust steam. The author observes that sufficient attention is rarely paid to this subject, which is of considerable importance, as there are many mills and factories where great waste of heat is allowed to go on. The most obvious method of saving the heat of exhaust steam is to use a condensing engine. Converting a non-condensing into a condensing engine will result in a saving of 25 per cent. of steam for the same horse power. But inasmuch as this economy can only be secured at the price of additional outlay for plant, the owner may justly inquire of his mechanical engineer whether the addition of condensing appliances will pay for itself, having regard to local conditions. Supposing a surface condensing plant to be adopted, which can be done where there is plenty of water available to use in condensing, the water resulting from the plant can be returned to the boilers. The drawback is that it is more or less greasy, according to the extent to which the steam cylinders and glands are lubricated. There is another type of surface condenser, suitable for land engines and boilers. In this a comparatively small quantity of circulating water is used to condense the steam, and the system approximates in character to the condensation of coal gas. The condensed water is greasy, as before, and the condensing plant is apt to become a nuisance. Where condensers cannot be applied, and water is expensive and space limited, the heat of exhaust steam should be utilized for warming the feed-water, instead of condensing the steam. It is impossible to utilize in this way all the heat of exhaust steam. What else to do with it, however, is not easy to say. The real difficulty consists in the fact of the lowness of the temperature. There are few industrial uses for merely warm water.

The Efficiency of Incandescent Electric Lamps.

In a paper read before the North-Western Electrical Association of America, Mr. John E. Randall stated that the present efficiency of incandescent electric lamps "lies somewhere between 3 watts per candle power and 3¼ watts per candle power." This declaration admittedly makes it appear that no advance has been made in the manufacture of incandescent electric lamps during the last thirteen or more years of its extensive growth. There was talk of 2½-watt lamps so long ago as 1885; and at that period 3½-watt lamps were considered a regular article of commerce. Since then, says Mr. Randall, "every investigation of claims for extremely high efficiency has shown that there was some hocus-pocus—either the candle was of the wax taper variety, or the watt was not one of the family that James made famous, or else the lamps did not live to tell the tale." As a matter of experience, it was found that lamps showing an initial consumption of less than 3 watts per candle power would not last a reasonable time on commercial circuits. This consideration set the maximum limit of efficiency. The minimum was set by what consumers would stand; and this was 4 watts. The broad result is that, so far as the user is concerned, the incandescent electric lamp remains pretty much what it was at the beginning in all essentials, though makers have learnt a good deal respecting its weaknesses as well as the best means of curing them. Mr. Randall says: "A graphitic coating covering an amorphous carbon body, in a vacuum, is, so far as known, the best combination" for an efficient incandescent electric lamp. "The science of lamp making consists in knowing how the carbon body can be formed, how the graphitic coating can be given; and how the vacuum can be produced. The art of lamp making

consists in doing these things perfectly and uniformly a thousand times over every day." The modern high-voltage lamps are made with a cellulose filament; but Mr. Randall does not say much about their efficiency.

Effects of a Petroleum Fire.

Now that petroleum is stored in bulk on many gas-works—with every precaution against fire, and every arrangement for minimizing the damage resulting from fire that knowledge and forethought can suggest—it is expedient that those who have the care of these stores should possess the fullest acquaintance with the nature of the effects that petroleum fires are competent to produce. In this connection, particular interest attaches to the recent burning of the petroleum tank steamer *Attila*, while carrying a cargo of oil from Philadelphia. The story has been told in "Engineering." It appears that the vessel went aground, the shock starting the boiler-room bulkhead, so that the oil obtained access to the furnace fires, when of course it ignited. As water entered the ship at the same time, the burning oil was floated up to about the level of the cylinder bottoms; and here its heat was so great that two of the cylinders were actually melted. The main steam-pipe was also melted; and so was one part of the valve-cover of the third cylinder. The valve inside was not even distorted, though it must have been subjected to intense heat. The column tops were partially melted, which is assumed to have been caused by molten metal from the cylinders dropping upon them. The safety-valves on the boiler tops were partially melted; but the boilers were not in any way damaged—the lagging on the upper portions having efficiently protected the shell above the water-level. The cargo burned a week; and the effects show the intense heat of a petroleum fire burning in a small space and the limitations of its action.

The Loss of Heat by Buildings.

The study of mechanical ventilation problems is much more developed in the United States than anywhere else, to judge from the prominence accorded to the subject in American technical publications. It is rarely that one finds a number of the "Engineering Record" without an example of heating and ventilation practice; and in a recent issue this publication gives some interesting particulars concerning the working of a so-called "hot-blast" system of heating and ventilating as installed several years ago in the New York State Veterinary College. One of the special points of this report is the consideration given to the loss of heat from a building, which is, of course, a datum of fundamental importance irrespective of the method of heating employed. At noon of a certain day, when the mean temperature inside the building was 68° Fahr., it was found that 1600 British thermal units per minute went to maintain this warmth. The quantity of heat carried off by the ventilation flues was nearly 39 per cent. of the whole; so that 61 per cent. must have escaped by the walls and windows. In Professor Carpenter's book on the subject, it is laid down that the loss of heat of a building per hour can be taken closely at one British thermal unit for every square foot of glass; and one-fourth as much for every square foot of wall exposed, for each degree difference in temperature between the inside and the outside. The building now in question had 9281 square feet of glass, and 31,644 square feet of exposed wall surface. In accordance with Professor Carpenter's rule, it would lose 7911 units from the walls and 9281 units from the glass for every degree of variation of temperature. The difference was $68-36=32°$. The computed loss is therefore 532,952 units, while the observed loss was 549,000 units per hour, besides what was carried off by the ventilating currents. Hence the observed and computed results differed by not more than 2 per cent., which is sufficiently close as a verification of Professor Carpenter's rule above stated.

Action of Acetylene on Rubber.—A question having been raised as to the suitability of ordinary gas-bags for holding supplies of acetylene gas, an experiment was tried to settle the matter. A new and air-tight bag was filled with acetylene, and pressure applied to it. The gas began to penetrate the rubber in less than half an hour; and in three days the whole of it had escaped.

Society of Engineers.—At the meeting of the Society on the 4th prox., a paper on "The Protection of Underground Water Supplies" will be read by Dr. J. C. Thresh, the Medical Officer of Health to the Essex County Council. The author will deal with the pollution of water falling on a pervious soil, the conditions necessary for specific pollution, and the natural purifying properties of the soil. He will advocate the protection of wells and springs, and the systematic and periodic inspection of all public water supplies.

Shiress-Will's "Law Relating to Electric Lighting."—We have received from Messrs. Butterworth and Co., the above-named volume, which has been prepared by Mr. J. Shiress-Will, Q.C., whose name is already well known to our readers as one of the authors of "The Law Relating to Gas, Water, and Electric Lighting." It contains an introduction, extending over 55 pages, followed by the English and Scotch Electric Lighting Acts, the Board of Trade Rules and Regulations, forms of accounts for companies and local authorities, and the form of a Provisional Order, with notes. There is a table of cases cited, an index of statutes, and a general index.

COMMUNICATED ARTICLE.

A HOUSE-TO-HOUSE INSPECTION WANTED.

By Norton H. Humphrys, Assoc.M.Inst.C.E., F.C.S.

Why is it electricity is so popular for shop-window lighting? Wherever introduced, this is the prominent line; and if other descriptions of lighting followed in anything like a similar proportion, the total output of electricity would be greater than is actually the case. If we stroll through some of the principal West-end streets of London, for example, it would appear from a cursory examination that electricity had obtained full possession of the artificial lighting. Yet we have it on official authority that there is still a large demand for gas in those districts. One answer to this question is that the superiority of electricity over gas has secured its introduction. The promulgation of the doctrine that electricity is a necessity that no one who expects to retain his social position can afford to ignore, is a clever appeal to the weak side of human nature. But there is no more reason in it than when a gentleman of title puts himself forward as necessarily superior to a plain "Mr.," or when a professional man holds himself as above a tradesman. Mr. Smith may be as good as My Lord Tom Noddy, and a baker or greengrocer is not necessarily inferior to a physician or lawyer; and so it does not follow that, because electricity possesses some advantages, it is better than gas anywhere and everywhere. Its adaptibility to any form of window dressing, and the absence of products of combustion, are a special attraction to jewellers and fancy shops, as by using a large number of lamps a delicate, fairy-like appearance can be secured that is unobtainable in any other way. But for high-power lighting, the arc lamp offers no advantages over gas. Many shop-fronts are lit—and well lit, too—by the agency of gas; and by means of well-arranged outside or top lights, it is possible to obtain a characteristic warmth, mellowness, and breadth of effect, quite as attractive as anything that can be done by means of electricity.

I think the fact that the electric light company usually employ canvassers has something to do with the matter. These gentlemen walk round in the evenings, and mark any establishments that are badly or inefficiently lighted as affording good ground for exploitation on the following day. So far as the gas company are concerned, they have the field to themselves. The gas company may have a notice on every account inviting complaint from all who have a defective supply; but the consumer hesitates about writing to the office. He is dilatory, or feels a kind of repugnance at finding fault, or thinks that no benefit would result and that nothing will make the "abominable gas" give a good light, or that the Company will only put him in a larger service and make his bill heavier. So the matter drifts, until someone comes and has a quiet talk with him. If we call at the gas office and inquire how business is going on, we shall be told that the electric light has not reduced the sale of gas. A reference to the shop-windows, may bring out a reply to the effect that there is actually more gas sold in the principal streets than before. Further inquiry, however, elicits the fact that, in a quiet unobstrusive sort of way, more energy and enterprise is being developed in the sales departments. The terms on which services are laid on have been revised, the system of hiring out appliances extended, a show-room installed in a prominent thoroughfare, and so on; the plain English of which is that the loss occasioned by the removal of the gas-burners from the shop-windows has been covered by new business. A hole may be covered with a patch, but it is there all the same; and it is no use avoiding the fact that, if a large shop-front, formerly brilliantly lighted by means of gas, is now devoid of a single burner, the gas company have sustained a loss. If the annual consumption was 300,000 cubic feet and is now nothing, they are exactly 300,000 cubic feet short; and though an increase in other directions may cover or conceal it, the loss will still be there. Let us suppose that the Company has been able to place out twenty slot meters, which may bring in an increase to the tune of 400,000 cubic feet per annum. This does not necessarily prove that the Company are better off than before. The 300,000 cubic feet sold to one customer may be more profitable than 400,000 cubic feet sold to twenty; and while the consumption increases, it is quite possible that the class of business may be changing for the worse. But even if the new business is an advance all round, it is still worth while to consider if the 300,000 cubic feet customer cannot be retained as well. If a man loses a sovereign in the morning, and manages to earn two in the afternoon, he may take comfort at the close of the day that he is better off than he was yesterday. Yet this does not remove the fact that, but for the loss, he would have been the possessor of £3; and if he is wise he will mend the hole in his pocket, and do anything else that is likely to prevent a recurrence of the misfortune.

There is no question as to the importance—one might almost say the necessity—of enterprise in the matter of new business, and encouraging the development of fresh lines of gas consumption. While others are bidding for custom, gas must be well in evidence or be placed at a disadvantage; and this apart from any question as to the comparative merits of its would-be competitors. But even more important than this is to keep a hold on the present connection. If it is worth while to incur not only

an additional outlay, but a permanent increase in the annual charges, in order to secure new business, surely some expense may be advantageously undertaken on behalf of the present customers. The twenty slot meters mean a capital outlay of £100 to £150; and a monthly visit to each, counting up coppers, &c., quite represents a full week's work per annum for an inspector. Slot meters, with stoves and fittings on hire, are good lines; but they may well give place to any scheme that would satisfy the consumer whose fittings are antiquated and out of order, pipes badly sized for the duty required, or otherwise defective. An American gas manager recently remarked that every consumer was an advertisement for the gas company, but not necessarily a creditable one; and, further, that one bad advertisement attracted more attention and did more harm than twenty good ones would make up for. What is to be done, then, with the "bad advertisement"? Is he to be left to fall into the hands of the first electrical agent who passes by? The dimly-lighted drawing-room or parlour is visible at first hand only to the owner and his friends; but the dim shop-window is a spectacle to gods and men.

Temporizing with the bad advertisement is of no use; there must be a radical cure. Directly we say that the existing gas appliances are useless, and must be entirely replaced, there is an outcry about expense. One remedy for this is to extend the hiring system, now generally adopted in the case of cooking or heating stoves. But already, with these limited lines, there are signs of trouble with the stock account. Obviously the investment in goods for hire must be limited within certain proportions as compared with the total turnover. A concern with a gas-rental of £10,000 per annum can manage about £1000 sunk in the hiring department without much trouble; but directly we talk of going to £2000 or more, there is a difficulty. The investment is not of a sufficiently permanent nature to warrant a place in the fixed capital; and the usual rates of rental, after paying expenses, do not leave a sufficiently large sum to go to the sinking fund. The remedy for this is the hire-purchase system. Spread over a term of years—say seven or ten—a slight increase in the present rates will furnish sufficient to provide for the sinking fund, while it also gives the consumer an interest in the apparatus that leads to greater care and saving of repairs. In some districts, the usage of hired appliances is so careless that the hire-purchase is practically in vogue; the apparatus being knocked to pieces and rendered valueless by the time that it has been paid for in rental. The prospective ownership is an inducement to the consumer, and enables the cost to gradually disappear from the company's ledger. If at the end of, say, seven years' use the appliance has been reduced to a condition that renders it valueless and fit for nothing but the scrap-heap, there is an end to it, and it is of no more use to the gas company; but if it has been carefully looked after, and is still in good working order, it is obvious that the company may look for further prospective benefit, even if it is presented to the consumer free from all restrictions.

The suggestion that I have to offer is that a system of house-to-house inspection, coupled with some sort of hire-purchase system that would secure immediate benefit by means of deferred payment, would at least be successful in retaining a large amount of high-class business that is now being drawn away; while it would probably introduce as much new business as is represented by the slot-meter trade. It would be less costly, as compared with the amount of business done; and it would also afford an encouragement and stimulus to gas-fitting and burner manufacturers that does not at present exist. The free application of the hiring system to gas cookers by gas companies, has, among other advantages, led to a marked improvement in the design and manufacture of that line of goods; and a similar result would most assuredly follow a large demand for the best makes of gas-fittings and burners.

But one may be asked a question as to the effect of this course upon "the trade"—that is, upon the retailers of gas-fitting appliances. There were several growls as to the result of the adoption of the hiring system, which was said to practically kill the shop sales of gas-stoves; but no actual returns giving statistics have ever been published. It must be remembered that one reason for taking up the system was the comparatively small number of stoves used. I have known districts where scarcely twenty stoves were employed, but which now show several hundred on hire; and this looks more like establishing a new trade than trenching upon an existing one. If a brisk business in the sale of gas-stoves was already being pushed, I do not think a gas company would rush in with the hiring system, as it would suit them better if the trade was done by others. So it is with lighting appliances. The installation would be more of the nature of new business, of creating a fresh demand, than of meeting a standing order that would in other case go to the shops. It is also possible that many undertakings would be glad to arrange terms with gas-fitters for carrying out installations to their instructions. In any case, gas companies have no interest in cutting in against existing tradesmen; they would rather encourage independent trade. They may have the monopoly of gas supply; but they have never sought to secure the monopoly of appliances right up to the burner. At the same time, when other competitors for lighting are actively in the field they must look to their laurels. They cannot afford to lay by because "the trade" objects, but must do everything in their power to encourage and stimulate the sale of gas.

TECHNICAL RECORD.

NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

The Annual Meeting in Boston.

(*Concluded from p.* 647.)

The next item was a paper by Mr. W. S. Allen, entitled "Some Notes on European Gas-Matters," which has already been noticed in these columns (*ante*, p. 530).

The President called upon Mr. Nettleton, who had recently visited Europe, to open the discussion. Mr. Nettleton said that he visited Mr. Humphrys at Salisbury; and the chief point that struck him there was the fact that in a residential district only, without factories, the annual sale of gas amounted to nearly 5000 cubic feet per inhabitant. He also had the pleasure of meeting Mr. George Livesey and Mr. Frank Livesey at the Old Kent Road. There he heard that the great thing in England was the introduction of slot meters. The South Metropolitan Gas Company had put out 60,000 during the last seven years. The expense had been very great, averaging nearly £6 per consumer; but the Company charged 10d. per 1000 cubic feet extra on the gas supplied under this system. He saw some benches of tens—five rows of retorts—some station meters in cement tanks instead of iron cases, some large furnaces each of which supplied heat for eight through beds, and also a sulphur recovery process. Mr. Egner said one of the first things he learnt, on his recent European visit, was the importance of breaking the coal, and its effect on the yield per ton. He agreed with all that was said in favour of inclined retorts. The difficulty about the proper angle of inclination was now quite under control; and the retorts could be charged with an evenness from bottom to top that could not be approached in any other way. In the course of his reply, Mr. Allen mentioned that at Paris, within the space of two years they put out 71,000 prepayment meters; and the average consumption was 8000 cubic feet per annum, which paid very well at the price charged for gas.

A paper entitled "Some Incandescent Burners" was read by the Secretary, in the absence of the author, Mr. N. W. Gifford, of New Bedford. There were no less than forty differently named burners sold in New York; and some of them differed in name only. Most of the special claims were vested in the mantles; but in one or two instances the burner itself was improved. One claimed to affect regeneration, and certainly improved the duty obtainable. Burners with a solid button in the centre of the gauze gave a better effect than the plain gauze. A Sugg argand was used as a standard; and a table was given showing the results obtained in 49 tests, and stating name, number of hours the mantle had been used before test, consumption of gas, illuminating power, candle power per foot, specific gravity, and pressure. As all mantles do not light up equally all round, an average of three positions was taken. The quality of the gas used ranged between 18 and 20 candles. The Welsbach mantle gave the best results; but the Sunlight with didymium mantle made a very good second, averaging some 15 candles per cubic foot, which showed no appreciable falling off when tested every 100 hours up to 1800. The Victor mantle and burner gave a high duty—over 20 candles per cubic foot, but fell off to 13 candles in 500 hours. As regards time of use, continuous burning might not have the same effect as frequent lighting and extinguishing. Narrow chimneys gave the best photometrical results; but it was quite possible that the wide chimney, by prolonging the life of the mantles, might prove cheapest in the end. Some tests he had made with high-power kerosene lamps, showed that with oil at 6d. per gallon the cost of a 50-candle power light was about ¼d. per hour for oil.

Discussion being invited, Mr. Eilbeck claimed, as a representative of the Welsbach Company, that no other would approach the Welsbach burner in efficiency or in durability of the mantle. Many of the mantles supplied by other parties would not bear transport. The Welsbach Street Lighting Company had a special burner for this class of lighting. The results were very satisfactory, having proved successful beyond expectation; and business was increasing very rapidly. Mr. Harbison remarked that the Welsbach was being undersold by other makes offered at one-third the price, and which were found in practice to answer as well. He referred to the excellent burner for outside lighting that had been introduced by the Welsbach Company; but the terms on which they were supplied were almost prohibitory. He made a test of another make of burner for outside lighting, which had proved very successful; and he hoped it would help him to get back some of his lost street lighting business. Mr. Nettleton would like to see the Welsbach prices lowered. The other mantles might be poor; and though this did not affect the Welsbach Company to any extent, yet it did affect the gas companies. Mr. Mansfield introduced a dozen Welsbach burners into ordinary square street-lanterns, some two years ago. At first there was much trouble, as mischievous boys shook the columns to see the mantles break; but they soon got tired of that. Either the mantles were now stronger, or they were more used to them, but they lasted three months or more. The lighting was a success; and the adoption of the system would be extended. The employment of "light-house" chimneys had a marked effect in preserving the mantles. Mr. Sherman was using with satisfactory results 200 lanterns

fitted all complete by the Welsbach Street Lighting Company. Mr. Ramsdell had nearly 100 Welsbach burners in use for street lighting; and he considered it the most effective system he had ever seen. They had been running for some three years; and though there was difficulty at first, it was only temporary, and such as might be expected. The only trouble he had of any importance was caused by spiders and insects; and he had remedied this. Mr. Shelton, in moving a vote of thanks to the author of the paper, added a vote of commiseration because no reference to the paper had been made in the discussion.

The meeting next proceeded to discuss the question as to whether a company having the usual exclusive rights to make and sell gas in a district, with powers to open up streets, &c., could prevent a new company from supplying compressed acetylene in cylinders delivered by a waggon service. Mr. Lamson thought that the "exclusive" right settled the question at once in favour of the old company. In Massachusetts, the new company would have to apply for a charter, which would not be granted. Mr. Shelton thought the old charter rather gave the exclusive right to the use of the streets for mains than any exclusive rights to sell gas; and that anyone who sold acetylene or other gas as an ordinary commodity, without opening the streets or other privileges, could not be interfered with. A man could sell anything he pleased, so long as he did not trespass upon police ordinances, health laws, or other public regulations. It was settled, for example, that gas could be supplied to a private block, even if it included 50 houses, so long as the main did not cross the street. He feared the old company would find it a hard job to stop the sale of compressed gas on the lines indicated. In fact, charters had been granted in some of the States for such a purpose, notwithstanding the protests of existing gas companies; but he had not heard that an instance had actually come into the Higher Courts. Mr. Coffin thought the objection of the old company could not be sustained. Mr. Harbison took a decided exception to Mr. Shelton's argument, and held that no individual or company had a right to compete or interfere with any existing business which had been specially chartered by the Legislature of the State. They must first obtain a charter, to show that they had a right to go into the business. The right to open streets was an incidental matter; and it had been legally decided in Connecticut that a city did not own its streets—that the city of Boston, for example, as a Corporation, did not own the streets of Boston. He believed that, if an acetylene company started anywhere in Connecticut without a charter, they would be enjoined at once. The President said that in Massachusetts he believed any company could go into gas or electric light business, so long as they did not use the public streets; and also that in Boston there was an unchartered Company supplying electricity in one particular square. Mr. Taber thought the President was in error, and that the Company mentioned had a charter from the Gas Commission. Mr. Slater remarked that the question as put assumed an *exclusive* right to sell gas; and the point was whether that was right.

A question was asked as to whether adjacent owners of property had ever been successful in preventing the erection of a new gasholder. Although two or three instances of objections being raised were related, it did not appear that any of them were successfully carried through.

Mr. W. M'Gregor, of Pawtucket (R.I.), read a paper entitled "The Winning Ways of Gas," and expressed a very high opinion as to the future of gas. There were many rivals in the field, so it was necessary to be always doing, looking after, and catering for the wants, needs, and necessities of the public. Gas should be above suspicion in respect to quality; and it should be sold at a moderate price. He utilized his billheads (front and back) for advertisements, in piquant and snappy phraseology. There was always a full line of pamphlets, illustrations, &c., in his office for the use of his customers. He took up the agency for every satisfactory appliance available for the consumption of gas, and had a good shop in the main street where the whole were exhibited in full operation. Cooking demonstrations for the ladies, and engine displays for the men, were frequently given; and the attendants were made to thoroughly understand that uniform courtesy and deference must at all times be extended. His carts and waggons were all utilized for advertising; one example of this being a large painting of a Welsbach light, with the motto "Half the gas—three times the light." All the employees were interested in the sale of stoves and appliances; and "cooking-stove parties" were arranged at private houses, a representative from the gas-works attending and superintending the whole affair. After a dinner prepared at the gas-stove had been served, the "gas-stove doctrine" was presented in a few well-chosen words. Free stoves were presented to all the charitable institutions, church societies, and newspaper men. A man was exclusively employed in a house-to-house inspection of burners, &c. He commenced introducing prepayment meters on Jan. 1, 1897. He already had 575 of them in use, and spoke enthusiastically of this line of business. He inspected all gas-engines once a month, and encouraged suitable shopkeepers to canvass for him by giving them a gas-stove free and a bonus on each order secured. In addition to this, he at times employed special canvassers. All orders and complaints were promptly attended to; and he made a speciality of Welsbach lights—fixing them at cost price.

The President, in inviting discussion, remarked that in most superior class houses, where the gas-stove was used extravagantly, he found it a good plan to put in a prepayment meter for the stove only. Mr. Coffin had followed the plan of selling the Welsbachs at cost, which of course meant (since the regular retail price could not be reduced) throwing in pipes or fixtures *gratis*. But the recent reduction in price did not leave much margin for this. Putting a governor on the inlet to the cooking stove, was a good way of inducing economy. The majority of domestics had no interest in the gas bills, and did not care how much gas they used. In the case of a tailor's stove, the introduction of a governor reduced the consumption of gas nearly one-half, and secured the continuance of the use of gas for this purpose. Mr. Woodward had adopted prepayment meters with stoves, and advised his customers to give the cook some inducement to economize gas. He had thus largely increased his output of stoves. He thought the paper important; the selling department should be pushed for all it was worth. He found it advantageous to allow a liberal discount for prompt payment at the office, and also that the prepayment meters were a great success, frequently getting £3 or £4 per month where otherwise there would be no business at all. He supplied Welsbach lamps, and kept them in repair at fixed rates; and if the consumer would sign an agreement limiting the number of hours of usage, he gave a price to include even the gas used. In this way, he competed with the electric light, which was supplied at a fixed price per month; and he did not lose money on the contracts. Last year he adopted the plan of fixing stoves free—the stove being sold at cost—with the result that his output for the season was 125, against something under 30 in previous years. Gas companies should keep the control of all burners and appliances used. He had been fairly successful with gas-engines. He used every possible means of cultivating a kindly feeling and overcoming the natural antagonism of the consumers. His attendants were also encouraged to be courteous, and they received a bonus on appliances sold. All his streets were now lit by gas under a contract with the Welsbach Street Lighting Company. The prepayment meters averaged 10,000 cubic feet per annum. Mr. Roper said that many of his consumers thought increased pressure meant increased cost; but he had proved by experiment that a gallon of water could be raised to boiling with the same quantity of gas, whether the pressure was 1 or 4 inches. The higher the pressure, the quicker the time, and of course the greater the liability to waste. So if a consumer complained that, by increasing the pressure his bill had been increased, the reply was that such a result was due to his own carelessness. He quoted some experiments which showed that gas at 6s. 3d. per 1000 cubic feet was much cheaper than coal for cooking; and he instanced some common defects in the construction of gas water-heaters.

This concluded the business of the meeting.

PRODUCTION OF AMMONIA AND UTILIZATION OF AMMONIACAL LIQUOR.

The above subjects were brought before the members of the Belgian Association of Gas Managers, at their last meeting, in two communications by M. Fernier and M. Willot, the text of which appears in the current number of the "Journal de l'Eclairage au Gaz."

The first-named gentleman dealt with the results of some experiments which had been carried out by him with various mixtures of coal for the purpose of determining the quantity of ammonia in the gas, as well as that contained in the liquor, at different points in the progress of the gas through the apparatus. The total quantity of coal carbonized was 251 metric tons; the gas produced being 70,037 cubic metres, or about 2½ million cubic feet. On leaving the hydraulic main, the gas contained, on an average, 8·836 grammes of ammonia per cubic metre, reduced to 0·194 gramme at the outlet of the "Standard" washer-scrubber. The water from the ammoniacal liquor scrubbers contained ammonia corresponding to 1·736 grammes per cubic metre of gas; that from the clear water scrubbers, 1·342 grammes; that from the "Standard" washer-scrubber, 3·561 grammes. The total quantity of ammonia in the gas was 9·562 grammes (147 grains) per cubic metre; in the liquor, 10·305 grammes (159 grains) per cubic metre—being respectively 2·610 and 2·821 kilos. per ton of coal carbonized. Taking a year's working, the quantity of ammonia sold was at the rate of 2·453 kilos. (5·4 lbs.) per ton of coal carbonized.

M. Willot's communication dealt with the utilization of ammoniacal liquor in agriculture. The author has for several years been conducting experiments in this direction, more especially in the cultivation of beetroot. It appears that several of the manures employed for this purpose are not only expensive, but injurious in their action, inasmuch as they give to the roots saline properties which are detrimental to their use for making sugar. Beetroot is specially liable to be attacked by a parasite of extraordinary fecundity; the female containing from 300 to 400 eggs. A couple of these creatures are capable of producing between April and November, with their progeny, an almost incalculable number of their kind. Fortunately, the incubation of the eggs does not go on in winter—the female "saving herself up" for vigorous action on the return of warmth and moisture. Now, M. Willot has for some years been waging war against these hordes of marauders; and the weapon he has used has been crude ammoniacal liquor. He has studied these creatures,

and, like a good general, has found out his enemy's weak point It is useless to attack them with ammoniacal liquor in winter. The female is then covered with a protecting coat which nothing weaker than hot sulphuric acid will touch. But when she re-appears in the early days of spring she loses her armour; and then the liquor can be effectively brought into play. M. Willot cited the results of experiments carried out at Fociel. Not only was the application of the liquor efficacious in getting rid of the insects, but the ground produced, without the application of any other manure, either natural or artificial, four crops of sugar-beet in succession. The land is still growing beetroot under the same conditions as before. M. Willot is now conducting an experiment on some land at Heylistein which is much infested with these harmful creatures; and he has no doubt the results will be such as to convince Belgian agriculturists of the special value, in this connection, of crude ammoniacal liquor suitably employed. If this should lead to an increased demand for this product, gas managers will have reason to thank those gentlemen under whose auspices the experiment is being carried on.

REGISTER OF PATENTS.

Manufacture of Acetylene.—Baldwin, G., and Crastin, C., of Holloway. No. 5445; March 1, 1897.

This invention has for its chief object to automatically supply water to the calcium carbide when the pressure of the gas within the storage tank or holder falls below a given point, to cut off the supply when the gas pressure rises above a given point, and upon a further rise of pressure (caused by a reduction or the cessation of the consumption of gas) to at once discharge all free water from contact with the carbide, permitting the latter to dry, and so cause the generation of gas to cease.

The apparatus for this purpose comprises: A combined water-tank and gasholder; a gas-generator; a displacement cistern, placed at a suitable elevation, and connected with the lower part of the water-tank; a water-pipe rising vertically therein, and by a branch rising from the lower part of the vertical pipe connecting the water-tank with the upper part of the generator so as to supply water to the carbide; a gas-pipe, connecting the upper part of the generator with the upper part of the water-tank, in order to conduct the gas into the latter; suitable valves controlled by a float within the water-tank, for closing the pipe supplying water to the carbide and the pipe supplying gas to the water-tank; and a water-pipe fitted with a non-return valve connecting the lower part of the generator with the lower part of the water-tank, for the passage of free water driven out of the generator by the gas, and of any further gas generated after the closing of the gas and water valves.

Explosion Engines.—Lees, J., of Ashton-under-Lyne. No. 5736; March 4, 1897.

This invention relates to gas-engines having two explosions to each complete revolution—that is, one in each direction; and it consists principally in the employment of an improved cycle of operations consisting of four periods: (1) The explosive mixture is admitted to one end of the impulse cylinder (compressed if necessary), and ignition takes place. (2) The force thereby produced gives the impulse to the piston, which is continued to the end of the stroke. This occupies one-half of the complete cycle. (3) The exhaust-valve is opened, and the spent gas is drawn out of the impulse cylinder, by a pump or otherwise; and, the inlet gas and air valve being closed, it is locked. (4) When the return stroke is about half completed, the exhaust-valve is closed; and the gas inlet-valve is unlocked. The explosive mixture is then admitted to the other end of the impulse cylinder ready to be fired again—thus completing the cycle. The cycle of operations is repeated alternately at each end of the impulse cylinder; but the exact point at which the exhaust-valve is closed (fourth period) may be altered to suit requirements.

The exhaust gas is drawn out of the cylinder after each explosion, by means of a pump or other exhausting device directly or indirectly connected to, and driven by, the engine. Between the exhaust-pump and the impulse cylinder is a cooling condenser, through which the exhaust gas is drawn on its way from the impulse cylinder to the pump, or other exhausting device, which forces the exhaust gas out into the atmosphere.

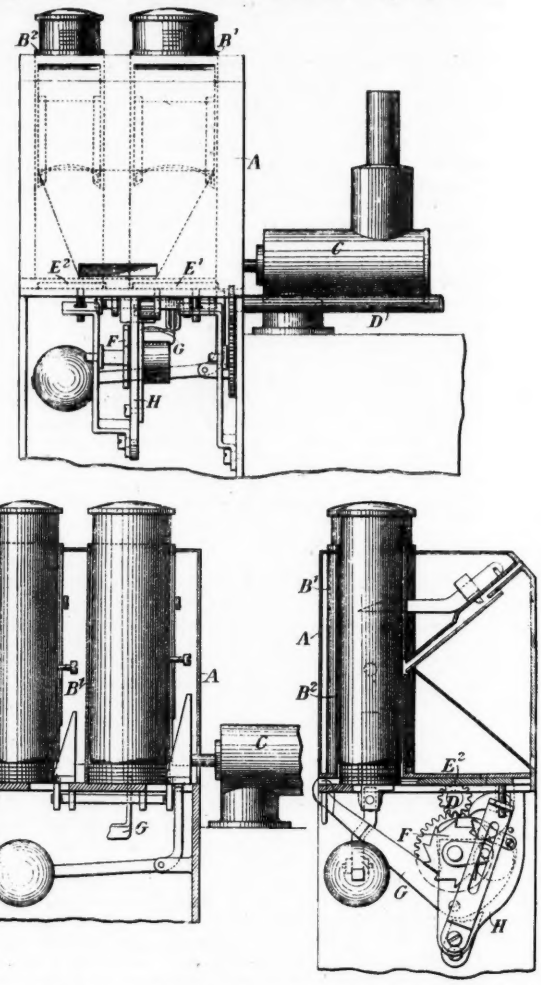
Coin-Freed Meters.—Simmance, J. F., of Page Street, Westminster. No. 7243; March 19, 1897.

In explanation of his invention, the patentee says: The object of this invention is to modify the coin-freed mechanism of meters in such a way that several coins of different values can be employed—those of a higher denomination keeping the meter in action, and delivering a quantity of gas which is the same multiple of the quantity delivered for a coin of lower denomination as the value of the higher coin is of that of the lower. The chamber into which the coins are introduced is also arranged so that when a coin of inferior value is introduced, it is at once returned without having any effect on the meter.

The illustration shows (in front view and sections at right angles to each other) the invention applied to coin-freed mechanism for a gas-meter such as is described in patent No. 9216 of 1896—the mechanism being arranged so as to work with either of two coins, the one twelve times the value of the other—shillings and pence.

A is a chamber having at its upper front corner two slots—one for insertion of the penny, and the other for the shilling. The coin is received from each slot on two sloping ledges, down which it slides to a cylinder B^1 or B^2, when a stop is removed by the act of lifting the plunger—this stop projecting from a lever acted on by a pin upon the plunger. Between the pairs of ledges there is such width as will allow in each case a smaller coin to slide down a slope to an outlet-slot, from which it issues. A number of coins may be successively inserted into the slot; the plunger being lifted each time, or held up, so that a pile of coins may be accumulated under each plunger—the number being shown by a scale on the face of the plunger presenting so many of its graduations above the top of the cylinder.

C is a box containing the supply-valve of the meter, kept usually closed by a lever loaded by a weight or spring, acting against a head on its stem. This head, and another similar head rigidly connected to it, has its face sloped in such a manner that, when a coin is depressed by pushing down the plunger, the edge of the coin acting on the sloping face pushes it back, and thus opens the valve, whereupon the meter is supplied with fluid and put in action. A spindle D (caused to rotate by any suitable gear connecting it to the counter-mechanism of the meter) drives a crank at such a speed as to make one revolution while a quantity of fluid is delivered equivalent in value to one of the coins under the plunger. The crank-pin is engaged in the slot of a lever, to the end of which is linked a sliding plate E^1, which by the rotation of the crank is caused to make a stroke pushing forward the coin or the lowest of the coins under the plunger, until it falls into a suitable receptacle, and then to make a backward stroke, on the completion of which, if there be no longer a coin under it, and if there happens to be no coin under the other plunger, the heads are left free to advance and allow the loaded lever to close the valve in C, whereupon the meter is stopped. A similar arrangement of crank, a slotted lever, and sliding plate E^2 operates with a coin of the higher denomination under the second plunger; but this particular crank makes only one revolution while the other makes twelve, and only does so when there is no coin under the first plunger.



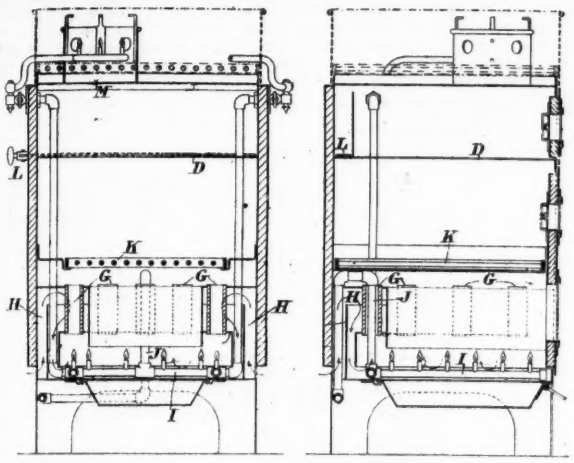
The sliding plate E^1 has pivoted on its under side a pawl, which engages with a ratchet-wheel F having twelve teeth; the ratchet-wheel being fixed on the axis of the crank pivoted to a bracket H, so that the crank makes one revolution while the plate E^2 makes twelve complete to-and-fro strokes. Consequently a coin of the higher value is not discharged from under the second plunger until the meter has delivered twelve times the quantity of fluid that is delivered in discharging a coin of the lower value from under the first plunger. When there happens to be a coin advancing under the first plunger, the coin depresses the arm of a lever G, which is pivoted on the bracket H, and carries a circular segment, which is thus moved to such a position that the pawl is held up by it out of engagement with the ratchet-teeth of F. The crank and plate E^2 are therefore not moved so long as there is a coin under the first plunger; but when there is no coin, then, the arm of G being free to rise, the segment descends by gravity out of the path of the pawl, which thereupon engages with the ratchet-wheel F, turning the crank and moving the sliding plate E^2 step by step while the sliding plate E^1 makes twelve to-and-fro strokes.

Gas Cooking-Stove.—Pringle, R., of Blackheath, S.E. No. 8405; April 1, 1897.

This invention relates to a gas-heated cooking-stove, constructed according to the principle of the stove for heating purposes described in patent No. 11,430 of 1895. It is shown in elevation on planes at right angles to one another.

The stove contains roasting-spaces separated by a grating K (so as to be at substantially the same temperature), removable in order that the two chambers may form one chamber of large dimensions, if required.

Above the upper chamber, and separated from it by a partition D, is an oven. Within the casing along the two sides and back of the lower chamber is a lateral air-heating chamber H; and in the top and bottom plates are fixed rows of vertical heat-radiating flues G (preferably of fire-clay), which traverse the air-heating chamber H, and open at top and bottom to the roasting-spaces. In the lower part of the lower roasting-space, and beneath the bottom plate of the air-heating chamber H, are burners upon a gas-pipe I, which connects with a regenerative gas-heating chamber J, formed by a vertical pipe contained in one of the flues G. The burners are not directly in line with the flues, but towards one side, and more or less beneath the bottom plate of the chamber H, so as to be out of the way of anything falling through. Air is admitted to the chamber H through apertures at the bottom of the casing, and is caused by a baffle to pass in an upward direction, and to circulate around the flues (whereby it becomes heated), and then downwards in the space between this baffle



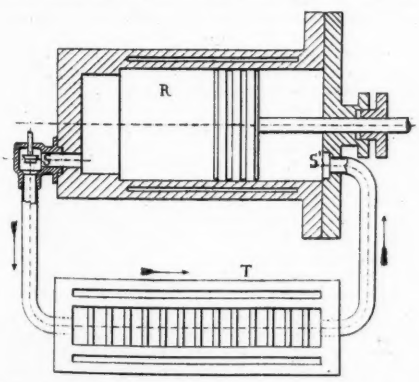
and an inner baffle. It is thus caused to enter the lower part of the roasting-space at a point near the level of the burners, so that the flames will not be blown inwards or be disturbed by incoming currents of air. The inner wall of the air-heating chamber is extended downwards as a curtain of such depth as to confine the products of combustion and prevent them spreading through the lower roasting chamber, and yet permit of the atmosphere of the latter chamber being heated by direct radiant heat from the flames, as well as from the heated flues and walls of the chamber H. The gases pass through the flues G to the upper roasting-space, and thence through holes in the bottom plate D of the oven; the draught and ventilation being regulated by a hit-and-miss damper L—a baffle directing the gases upwards on leaving the apertures, and preventing them spreading until they reach the top plate. This is provided with apertures M for the escape of the heated gases, over which cooking-vessels may be placed.

Gas or Hydrocarbon Motor.—Fritscher, A., and Houdry, A. R., of Provins, France. No. 10,005; April 21, 1897.

This invention relates to four-stroke gas or hydrocarbon motors in which the cylinders, two in number, are arranged vertically; and it refers more particularly: 1. To the operation of the discharge-valves in such a manner that the cylinders, although their pistons act simultaneously, have different periods—for instance, one is at expulsion while the other is at compression. 2. To the connection of the operating mechanism with the governor for suspending the action of the cylinders when the motor exceeds the regular speed. 3. To the arrangement of the governor for the purpose of enabling the speed of the motor to be varied by varying the resistance of the governor. The invention also refers to the general arrangement of the motor, and to certain minor features of detail.

Gas-Engines.—Fistié, E., of Sceaux, France. No. 22,564; Oct. 1, 1897. Date claimed under International Convention, April 29, 1897.

The features of novelty in this invention are: (1) The addition to gas-engines in general of a cylinder (called an exhaust cylinder) serving as intermediary between the expansion cylinder and the atmosphere; this



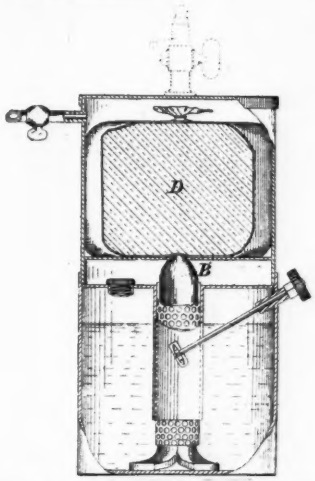
cylinder being either single or multiple, and forming part or not of the compressing apparatus. (2) Placing a refrigerator between the expansion and exhaust cylinders. (3) The utilization of the compressed gases entering into the expansion cylinder of the engine, for cooling the exhaust gases in their passage from the expansion to the exhaust cylinder, and which cooling may be completed in any type of refrigerator.

The engraving shows an engine constructed according to this invention (the usual admission and exhaust valves, being of ordinary construction, are not shown). This engine is analogous to a condensing steam-engine. R is the cylinder with its piston; S is the exhaust-valve, shown open; and S^1 the automatic clack-valve, also shown open. At the cylinder end, at S, the gases are at a temperature of (say) 500° C.; at S^1 they are at a temperature of only about 50° C. T is a refrigerator; water being circulated in the double casing.

Acetylene Generating Lamp.—Rhind, F., of Bridgeport, Conn., U.S.A. No. 20,051; Aug. 31, 1897. Date claimed under International Convention, Feb. 27, 1897.

This invention particularly refers to portable lamps in which it is impracticable to provide a generator adapted for withstanding great pressure or a gasholder of large capacity, for which reasons it is desirable that the generation of gas should not greatly exceed the consumption, and that it should be under the control of the operator.

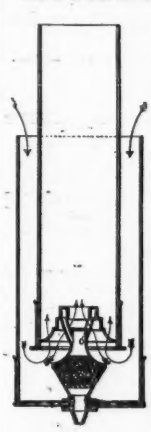
Several types of generators are shown and described in the specification. That selected here consists of a "font" of cylindric form, with an ordinary screw-stoppered filler opening and a central wick-tube. The wick adjuster consists of an ordinary pinion or star, and acts to raise and lower a sleeve surrounding and carrying the wick B. Above the font is a second cylindric chamber, the lower end of which is closed by a diaphragm, having a central aperture; while a mass of calcium carbide D, enclosed in a bag, occupies the chamber.



The two chambers being separated, the lower one is filled with water, and a bag of carbide is inserted in the upper chamber, so that it rests on the central diaphragm. The parts are then assembled as shown, the wick B is raised so as to be in contact with the bottom of the bag D, and by capillarity water is carried to the carbide. Acetylene gas is immediately evolved, and should be consumed at once. The amount of water brought to the carbide, and the consequent volume of gas produced, may be regulated by the wick-adjuster; the wick being coned at its upper end for this purpose. It is found in practice, says the patentee, that the amorphous lime formed at the bottom of the bag "has sufficient capillarity to carry the water to the remaining carbide till all is exhausted, with no substantial increase of resistance—certainly none that cannot be overcome by slightly raising the wick."

Gas-Burners.—Billing, C. E., of West Hampstead. No. 30,132 Dec. 20, 1897.

This is the arrangement of double-chimney burner referred to in the "JOURNAL" for Dec. 7 last, p. 1234; and the patentee claims "the combination with two chimneys, between which heated air can be drawn to the burner, of a chamber formed in the burner at its lower part in the lower end of the outer chimney, placed so that the heated air will strike upon it and heat the gas before ignition."



As shown, the outer chimney is shorter than the inner one, and is of sufficient diameter to leave an annular chamber between them. The support of the outer chimney has its openings closed by a disc of talc, glass, or the like, so that no air can penetrate through this part. The burner is provided with a metal chamber placed below the inner chimney, and within the lower end of the outer one; so that the heated air passing through the passage between them will strike directly upon the heating chamber. The lower part of the chamber is provided with a layer of charcoal, and above is a layer of asbestos. Both layers allow the gas to pass through; while the asbestos prevents any particles of carbon being carried forward by the gas. The layers are supported and separated either by means of discs of wire gauze or else by perforated plates.

Lamps for Generating and Burning Acetylene.—Wheatley, W. H.; a communication from C. W. Beck, of Chicago, U.S.A. No. 22,850; Oct. 5, 1897.

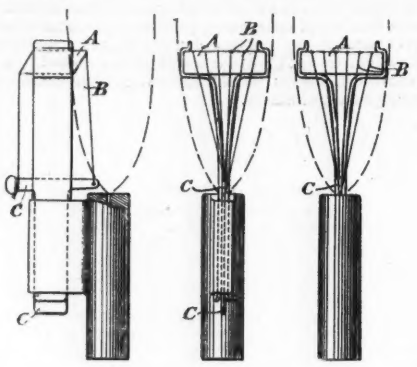
This invention relates to acetylene-gas lamps of the type wherein the gas is consumed practically as fast as generated—as distinguished from lamps or generators provided with a gasholder or storage vessel into which the gas is passed previous to its transmission to the burner.

Among the principal objects of the invention are: To provide means for maintaining an adequate and properly regulated supply of liquid to the carbide—it being understood that the rate of generation of gas is directly proportional to such supply; to provide a relief reservoir, adapted to receive the excess of gas when the pressure exceeds a predetermined limit; to provide means for opening and closing the generator, and at the same time insuring a gas-tight joint at the point of separation; and "to provide a generally improved and perfected generator of the character referred to." The invention is not further described apart from the drawings accompanying a lengthy specification (with claims) extending to more than eight pages of print.

Automatically Lighting Gas-Burners.—Borchardt, H., of Berlin. No. 30,906; Dec. 31, 1897.

This automatic lighting device consists of a system of platinum wires spreading in fan-shape from the burner-orifice towards a plug of platinum sponge to be employed for the purpose of securing ignition of the gas. The platinum wire carrier is retained in place by friction, and is adjustable in height, for enabling the tension of the wires to be controlled.

The illustration shows a side elevation, a rear view, and a front view of one form of the device.



A is the platinum sponge, retained between resilient clamps mounted in an extension of the burner. Between the clamps there is interposed a carrier C, automatically retained in place by friction, and adjustable in height; and to this carrier is secured the system of platinum wires B expanding upwardly in fan shape, and stretched over the sponge.

The patentee claims that, inasmuch as the platinum wires (which are arranged at approximately equal distances apart) expand or spread in front of the whole effective surface of the platinum sponge, all the heat evolved from the sponge is utilized in heating the wires, and the heat is transferred to the burner orifice by the shortest way. This action is all the more reliable, as all the platinum wires are within the gas-cone.

APPLICATIONS FOR LETTERS PATENT.

6164.—Guest, C. H., "Acetylene lamps." March 14.

6192.—Bower, G., "Burners especially applicable for acetylene, and other gases rich in carbon." March 14.

6212.—Horn, C. A. W., "Protective device for incandescent gas mantles and chimneys." March 14.

6394.—Smith, R. H., "Combined gas and steam generator." March 16.

6468.—Thorp, T., "Burner for acetylene gas." March 17.

6522.—Walsh, J., "Improvements in burners and globes." March 17.

6537.—Pearce, G. W., and Whitbread, S. J., "Coin-freed gas-meters." March 17.

6566.—Holland, J., "Acetylene lamps." March 18.

6625.—Imray, O., "Igniting and extinguishing gas-burners." A communication from Industriewerke Kaiserslautern Metall-und Porzellanfabrikation Gesellschaft mit beschränkter Haftung. March 18.

6645.—Bürstenbinder, R. G., and Lauenstein, F. C., "Producing gas by chemical means without the application of heat." March 18.

6647-8.—Boult, A. J., "Carburetting apparatus for internal combustion engines." A communication from C. de Haupt. March 18.

6678-9.—Marchant, W., "Valves for water, gas, and other fluids." March 19.

6748.—Rickman, W. B., "Enriching gas." March 19.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

The Cost of Hand and Machine Stoking.

Sir,—Referring to Mr. Lewis's request for further information on the machinery question, I beg to say that I erected a new retort-house at the Colne Gas-Works during the year 1892, and introduced regenerative settings and West's manual stoking machinery. The carbonizing wages since then have averaged 1s. 11½d. per ton. For the present year, ending March 25, the results are as follows:—

Total Labour Cost per Ton.	Total Labour Cost per 1000 Cubic Feet.	Interest, Oil, &c., Wear and Tear.
1s. 11½d.	2·02d.	1·20d.

The carbonizing wages include stokers, firemen, coal and coke wheelers, boiler and exhausters, and coal breakers and engine. The make of gas for the year was 111,500,000 cubic feet; the coals carbonized, 9869 tons; the make of gas per ton, 11,300 cubic feet; the make per mouthpiece, 7000 cubic feet; and the illuminating power, 17·5 candles. The men work 8-hour shifts with 6-hour charges.

Previous to the introduction of the machinery, the carbonizing wages cost 3s. 4d. per ton; and the gas made per ton was 9800 cubic feet. The stokers worked 12-hour shifts, and received 6d. per week less than they now receive.

I am aware that in larger works the advantages have been greater where machinery has been adopted.

Besides the saving in wages, my experience leads me (like Mr. Lewis) to attach considerable importance to the make of gas per ton, the illuminating power, and the ease with which the work is accomplished. The working of this retort-house, and the figures given, when compared with the old system of working speak for themselves, and they have given considerable satisfaction both to the Gas Committee and myself.

Colne, March 25, 1898. H. Simmonds.

The Gas Institute Meeting.

Sir,—I understand that it has been decided to hold the Belfast meeting from June 22 to 25. As this period embraces the June quarter-day, I wonder if it has been considered that managers of small or medium-sized works will be practically debarred from attending the meeting. Quarter-time at most works is a busy one, and those who are not actively engaged in meter-taking have generally to lend a hand, or at least find it difficult to be away when all the water is on the wheel.

Ilkeston, March 25, 1898. F. C. Humphrys.

Absorption of Water by Coke.

Sir,—Mr. O'Connor, in his letter in the last number of the "Journal," states that after heavy rainfall "coke will absorb as much as 20 per cent. of moisture." I think that this requires some explanation from Mr. O'Connor, as, when coke has been thoroughly slaked, my experience is that it will absorb nothing like this quantity of water. I have had a lot of coke placed under cover, and the same bulk of the same class of coke placed in the open, subject to all weathers; and after three months' exposure, the difference in weight was very little indeed. The quantity of coke experimented upon was in each case 1400 lbs.; and when weighed at the completion of the experiment the exposed coke was only 12 lbs. heavier than that which had been under cover during the entire period. At one time I sold coke by weight as well as by measure; and I had a countrywoman who evidently possessed the idea that coke weighed more after heavy rain than in fine weather, because during the wet weather she would buy her coke by the bushel, but in dry weather she purchased it by the hundredweight.

Malvern Link, March 26, 1898. J. H. Lyon.

Additional Purifying Plant for the Middleton Gas-Works.—Messrs. Clapham Bros., Limited, of Keighley, have secured a contract for the supply and erection of two 30 ft. by 20 ft. purifiers at the gas-works of the Middleton Corporation.

New Filter-Beds for the Newcastle and Gateshead Water Company.—The construction of eight filter-beds at Whittle Dene, has just been completed by the Newcastle and Gateshead Water Company, according to designs prepared by Messrs. T. & C. Hawksley. The beds are 200 feet in length, 135 feet in breadth; and from the top of the floor to the top of the walls 7 ft. 8 in. deep. At the bottom under the floor is a depth of 1 ft. 6 in. of clay puddle. Above this is a floor of concrete flagging; each bed containing 3500 of these cement flags, which were specially made on the spot. The thickness of the floor, including puddle, sand, and flags, is 1 ft. 9 in. Then is superimposed a layer 12 inches deep of big 4-inch gauge washed pebbles; above this is a layer 6 inches deep of 2-inch gauge pebbles; then a layer 6 inches deep of 1-inch gauge pebbles; then a layer 3 inches deep of ½-inch gauge pebbles; then a layer 3 inches deep of ¼-inch gauge gravel; and finally there is 1 ft. 6 in. of clean washed sand, with the water 2 feet deep on the top. The walls of the filter-beds are 9 ft. high, 3 ft. 3 in. wide at the bottom, battering inside to 2 ft. 3 in. wide at the top. The walls of each bed are strengthened by 30 buttresses; and the tops of the walls are finished by a heavy stone coping 2 ft. 2 in. wide, and 12 inches thick. All round these masonry walls on the outside is a clay puddle wall nearly 2 ft. 6 in. thick at the bottom, and 1 ft. 6 in. at the top. The beds are divided into two sections, between which are two pure-water tanks.

The Exeter Chamber of Commerce and the Gas Company's Contracts.—The Chairman and Vice-Chairman of the Exeter Chamber of Commerce (Messrs. W. Mallet and C. T. K. Roberts) recently held a reception of the members at the Guildhall, when a paper on the industries connected with the engineering and iron trades of the city was read by Mr. J. Gould King. The paper was of considerable local importance; but one point was of general interest, as it raised the question of the desirability of placing contracts for local work with local firms. Mr. King, in the course of his paper, referred to the "gas engineering concern on the banks of the Exe which can command the largest operations successfully, and which has a perfectly national scope." Of course, he was alluding to the establishment over which Mr. Henry A. Willey presides; and he said it was a "matter of honest pride" to those who had for many years watched its growth, and been brought more or less into association with it, to have such an establishment. While felicitating themselves as "citizens of no mean city," they might congratulate Mr. Willey on the conspicuous success which had attended the enterprise of past years, and the industry and hard work of later ones. In the course of the discussion, this part of the paper was specially noticed by Mr. Giddings. He pointed out that, though Mr. Willey had built up the business referred to in the last fifteen years, he had received very little assistance from Exeter. He sent work all over the West of England, and made gas apparatus for some of the largest works; but he did not do so for the Exeter Gas-Works. Commenting upon this matter, a local paper remarked that it was strange the firm in question did not get any of the Gas Company's contracts; and it seemed that the money gathered by them in the city was spent elsewhere. If the competition had been an open one, and Messrs. Willey had been beaten in tendering, of course there was nothing more to be said; though, "if the difference were only small, Exeter men spending Exeter money would be excused for a leaning towards an Exeter firm of much eminence. Possibly some explanation is available."

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills reported, with amendments: Edinburgh and District Water Bill, Edinburgh and Leith Corporations Gas Bill, Morley Corporation Gas Bill, Sheringham Gas and Water Bill, Swansea Gas Bill, Waterford City Gas Bill.

Bill read the third time and passed: Aberystwith Gas Bill.

The Morley Gas Bill will not be proceeded with.

The Filey Water and Gas Company have petitioned against the Filey Water and Gas Bill.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bill read the first time: Aberystwith Gas Bill [Lords].

Bills read a second time and committed: Clacton-on-Sea Gas and Water Bill, Gloucester Gas Bill.

Bills reported: Southend-on-Sea Gas Bill, Thanet Gas Bill, Tottenham and Edmonton Gas Bill.

The Frodingham Gas Bill is not to be proceeded with.

The Vestry of St. Luke's have petitioned against The Gaslight and Coke Company's Bill.

The Corporation of York have withdrawn their petition against the York United Gas Bill.

Last Thursday, the House ordered that the resolution of the Standing Orders Committee of the 8th of March with respect to the Filey Water and Gas Bill (Lords) should be referred back to the Committee, with power to inquire whether there were any special circumstances which rendered it expedient that the conditions upon which the Standing Orders were dispensed with should be further modified so far as regards the townships of Gristhorpe and Lebberston.

HOUSE OF LORDS COMMITTEE.

(*Before the Duke of* RICHMOND *Chairman, the Earl of* STAMFORD, *the Earl of* CARLISLE, *the Earl of* LUCAN, *and Lord* WENLOCK.)

The above-named Committee—to whom had been referred the Edinburgh and District Water Bill, the Edinburgh and Leith Corporations Gas Bill, and the Stirling Gas Bill—commenced on the 16th inst. the consideration of the

EDINBURGH AND DISTRICT WATER BILL.

The object of this Bill, which is promoted by the Edinburgh and District Water Trustees, is to provide an additional supply of water for the city of Edinburgh from their existing Gladhouse reservoir, in the watershed of the River Esk, by raising the waste weir by one foot, which will provide additional storage to the extent of about 108 million gallons, and also to lay down an additional pipe-track from the reservoir to Edinburgh; the present track at different parts being in some danger of collapsing from the extensive mining operations carried on in the district. The Bill was opposed by the Inveresk Paper Company, of Musselburgh, on the allegation that the Trustees proposed to abstract a great quantity of water from the Esk without giving compensation; and there were also petitions against the Bill by Major John Gibsone, of Pentland, and the Clippens Oil Company, Limited.

The case for the promoters was conducted by Mr. Littler, Q.C., Mr. Pember, Q.C., Mr. Balfour Browne, Q.C., and Mr. Frank T. Cooper. The Clippens Oil Company and Major Gibsone were represented by Mr. Pope, Q.C., and Mr. Clyde; and the Inveresk Paper Company, by Mr. Freeman, Q.C., and Mr. Lewis Coward.

On behalf of the promoters, it was stated that additional water was urgently required. The deficiency in the rainfall on the north side of the Pentlands had been such that numerous complaints of insufficient water supply had been received by the Trustees. The Bill provided for two aqueducts; but the second, which ran through a district where were a number of mineral works, had been abandoned. The other passed through igneous rock, and was clear of the mineral district; but notwithstanding this fact, the opposition had been maintained. The Paper Company objected to the raising of the reservoir level, on the ground that their supply would be diminished; but it was contended that everything which it was proposed to do under the Bill had been already sanctioned by Acts passed in 1874 and 1876, though technically the power to construct the works had expired. It was thus necessary to come again to Parliament. With regard to the petitions of Major Gibsone and the Clippens Oil Company, a great part of the former was done away with by the resolution not to proceed with the second aqueduct. As to the Oil Company's petition, the proposed aqueduct would go through a portion of ground over which they had a trial lease. It was, however, urged that there was no shale in the ground through which they proposed to go, and, besides, the trial lease expired next May. It was contended that these petitions were simply an attempt to obtain further compensation; and the object of the Bill was to get rid of the petitioners and their mineral rights altogether, and get away from them. The aqueduct was about six miles long; and the proprietors of only about three-quarters of a mile of the land throughout its length were opposing.

The first witness called was the Lord Provost of Edinburgh, who is the Chairman of the Water Trust. He stated that in 1893 the Trustees had to consider the expediency of still further increasing the supply of water to Edinburgh, and an Act was passed in 1895 authorizing a supply to be brought from the River Talla, a branch of the Tweed. The Talla works were in course of construction, and were very extensive. In the meantime, on account of the scarcity of water, the Trustees found themselves under the necessity of making the present application to Parliament, so as to keep up the supply until the water from the Talla could be brought in. The Lord Provost was followed by Bailie Archibald, the Convenor of the Works Committee, who said that the powers sought would enable the Trustees to maintain a constant service of water in Edinburgh and the district, and afford a liberal supply for street watering, sewer flushing, and other sanitary purposes. Mr. W. Anderson, the Treasurer of the Water Trust, supported the views expressed by the previous witnesses. The Medical Officer of Health for Edinburgh (Sir H. Littlejohn) said an increased supply of water was urgently required; and it would be a serious calamity for the city if the Bill were not passed. The Water Engineer (Mr. J. Wilson, M.Inst.C.E.) and Mr. B. Hall Blyth, M.A., M.Inst.C.E., spoke to the necessity for the works proposed in the Bill.

Additional engineering evidence was next given by Mr. G. H. Hill, M.Inst.C.E., who stated that the proposal in the Bill was nothing more than was necessary, looking to recent dry years. In his opinion, the clauses in the Acts of 1874 and 1876 were perfectly clear as to the right of the Trustees to take the surplus water now passing out of the Gladhouse reservoir into the River Esk. The usual compensation water was one-third of the total catchment. This compensation was not fixed by the works carried out, but by the rainfall in three consecutive dry years. He saw no reason, so far as the obligations of the Trustees in respect of compensation were concerned, why they should raise the level of the water in the Gladhouse reservoir by a foot. The reservoir was insufficient to store the quantity of water required. The opposing Paper Company were nearly 20 miles below the reservoir, and therefore a great quantity of water drained into the Esk between the two points. In his opinion, there was no reason why the Inveresk people should have any more compensation water than they would have under the Bill. The water which would be taken belonged to the Trustees under their existing Acts. The embankment of the reservoir was 7 feet above the waste weir, and the future proposed height of 6 feet was only what was usual. Mr. James M. Gale, M.Inst.C.E., expressed the opinion that the promoters were well advised in not carrying the proposed additional pipe from the reservoir along the track of the existing pipes, looking to the extent to which it had been rendered unsafe by mining operations. Mr. J. Gemmel, a mining engineer well acquainted with the district affected by the proposed works, held the same view. Mr. G. Wilson M'Creath, another mining engineer, said it would not be wise to risk the laying of another pipe over the mineral workings; and he entirely approved of the route proposed. Mr. Wilson added to his previous evidence the particulars that the Moorfoot pipe was 22 inches, and the old Crawley pipe 16 inches diameter. The new one would be a 16-inch pipe.

The Committee were addressed by Mr. Freeman on behalf of the Paper Company. He said he did not propose to call any witnesses, but he put it to the Committee very strongly that inasmuch as this was substantially a new undertaking, not covered by the Acts of 1874 and 1876, his clients were entitled to compensation. Mr. Pope afterwards addressed the Committee on behalf of the other petitioners. Mr. Armour, the Secretary and Manager of the Clippens Oil Company, and Mr. D. Rankine, Assoc.M.Inst.C.E., were examined. The point of their evidence was that the present aqueduct hampered the Clippens Oil Company in carrying on their underground mineral operations, and that to construct another aqueduct over their land would largely increase the difficulties. If the Trustees must have this aqueduct, it was contended that they ought at least to buy out the mineral rights of the Company.

Mr. Littler having addressed the Committee in support of the Bill, the Chairman, after a short consultation in private, announced that the preamble had been proved. Clauses were subsequently adjusted.

The Committee then proceeded to consider the

EDINBURGH AND LEITH CORPORATIONS GAS BILL.

By this Bill, the Gas Commissioners of the Edinburgh and Leith Corporations seek authority to construct new works at Granton, in accordance with a scheme described in the "JOURNAL" for Dec. 14 last (p. 1294), and to acquire certain lands; they also ask for various powers in connection with their gas undertaking. The Commissioners' proposals were objected to by Mrs. Dundas and Mr. Davidson, on the ground that the erection of gas-works in proximity to their property would greatly depreciate its value for residential and other purposes.

The promoters were represented by Mr. Pember, Q.C., Mr. Balfour Browne, Q.C., Mr. Worsley Taylor, Q.C., and Mr. Charteris; the opponents, by Mr. Pope, Q.C., Mr. Littler, Q.C., Mr. Erskine Pollock, Q.C., and Mr. Pitman.

In opening the case for the Commissioners, Mr. Pember said the object of the Bill was mainly the acquisition and utilization of a new site for works for the manufacture of gas for the supply of Edinburgh, Leith, and Portobello. The gas supply of Edinburgh and Leith had for some little time been concentrated; and a year or two ago, when the boundaries of the city were extended, the supply of Portobello was brought within the same controlling authority, which was a body of 23 Commissioners. The prices paid for the respective undertakings were in the form of perpetual annuities—Edinburgh, £20,000; Leith, £14,000; and Portobello, £1200—making a total of £35,200. There were at present three separate works and six gasholder stations. All were very crowded, and had no means of increasing their accommodation; while the consumption of gas was rapidly increasing. It was obvious that the concentration of the manufacture of gas was an important object. Numerous sites for the contemplated works had been examined, and the Commissioners had unanimously adopted one at Granton, close by the sea, and not far from the harbour, as proposed by Mr. W. R. Herring, their Engineer. Mr. George Livesey, Chairman of the South Metropolitan Gas Company—probably one of the highest gas engineering authorities—would appear before the Committee, and state that, after having examined all the sites, he selected unreservedly the one suggested. The site was on the property of the Duke of Buccleuch, and consisted of 106¼ acres of sound land and 4¾ acres of foreshore. It was a compact site, and interfered with few buildings. There were two petitions, however, against the Bill in respect of residences—one that of Mrs. Dundas, of Craig Royston; and the other that of Mr. Davidson, of Muirhouse. The advantages of the site were that the Commissioners would have a double railway connection, and also a connection by sea. These advantages were calculated to save about £7000 a year in the carriage of coal to the works, and £1000 in conveying the coke away from them. The sea connection would be by means of a pier or jetty which they proposed to erect. It was estimated that the site would enable the Commissioners to give an adequate supply of gas for the next thirty or forty years. With regard to the opposition, Craig Royston was undoubtedly within 300 yards of the proposed site,

and Mrs. Dundas was therefore entitled to *locus standi*. In the case of Mr. Davidson he would not have been entitled to notice, had it not been for the fact that a small lodge came within the limits provided for by the Standing Orders. But on this ground he would be entitled to raise the whole question of his property. This consisted of some 300 or 400 acres; but the house was half a mile off, and was well out of sight owing to the trees. The promoters were paying the Duke of Buccleuch £1100 an acre for the land; this high price being given on account of its industrial and not its residential value. The obvious destiny of this part of the suburbs of Edinburgh was to be industrial and not residential; and the petitioners might therefore reasonably be expected to benefit financially from the fact. A period of twelve years had been taken for the completion of the works; and the Commissioners asked for power to borrow £400,000. It had been said that the proposed site was unnecessarily costly. The Commissioners did their utmost to find the best one around Edinburgh, and they believed they had found it; and they were fortified in this belief by the highest scientific opinions. They had but one object —viz., to do the best they could for the public interest involved. They were not seeking to make profits, but to provide the best gas-works in the interests of the community; and the only question here was whether, in the public interest, the proposed change, and the expenditure consequent thereon were warranted.

Evidence was then given by Mr. W. R. Herring, the Gas Engineer of the Commissioners. He said he entered upon his present position in March, 1897, and had since made careful investigation as to the condition of the gas-works and the supply of gas in Edinburgh, Leith, and Portobello. In consequence, he had urged upon the Commissioners the necessity of taking steps to alter the present state of things. There had been a rapid increase in the consumption of gas within the Commissioners' area since 1894. In that year the electric light was introduced; yet in the three succeeding years (to 1897) there was an increase of about 2000 cubic feet per annum per consumer. In 1894 there were 62,000 consumers; whereas in 1897 there were 69,000. Before the introduction of the electric light, the average consumption of gas per consumer was 20,531 cubic feet; while it was now 22,273 cubic feet. The additional consumption did not arise from an increased use of gas for cooking purposes, but rather because the public desired to have a more brilliant light. The use of gas for cooking purposes had not yet been developed in Edinburgh; and probably only 1½ per cent. of the output was so used at present. The consumption per consumer in Edinburgh was only about 60 per cent. of what it was in the large English towns; but this was owing to the higher quality of gas supplied in Scotland generally, and to the fact that hitherto in Scotland they had been using very small burners. But the use of larger ones was now increasing; so that he quite expected the consumption would augment. The Corporations were supplying about 400,000 persons at present. There should always be a margin of reserve of 15 to 20 per cent. on the working capacity of gas plant, to allow for accidents and times of bad or excessively cold weather. The Corporations' reserve capacity last winter was only 9½ per cent. They were also greatly dependent on the coal supply; and any strike or interruption on the railway affected them seriously, and they had to fall back on their stores. At present they had thirteen days' stock; but owing to their limited space for stacking, they only kept in reserve coal of the highest quality, and had no storage for the average class which they used from day to day. The capacity of the various gasholders at present was 2¾ million cubic feet. It would take about two years to construct a large holder, provided there were no accidents or strikes. The Corporation had at present only about 66 per cent. of the proper storage capacity for gas. At Leith the gas was often sent out as it was manufactured; and the system was universally condemned. It should pass through the holder, because this permitted of an even quality being distributed. If sent out as produced, the quality might vary; and this caused annoyance to the public. The present gas-works were in an unsatisfactory, not to say dangerous condition as regarded furnishing a continuous supply of gas to the public. The result of an accident might be to put the town in darkness for a period; and even a small accident would cripple them to some extent. At present the North British Railway was the only one in communication with the works. The Railway Company were very good to them; but at times great difficulty was experienced in getting coal to keep the works going. They were in quite a hand-to-mouth condition. The cramped state of the works also made the cost of production greater than it otherwise would be. If all the works were concentrated on one site, where there was sufficient room for using the various modern appliances, there would be a saving of 4½d. per 1000 cubic feet, which would represent £25,000 per annum on the present supply. Even in the matter of getting rid of the refuse from the works, the tip afforded at the Granton site would save the Commissioners £7000 a year; and if it lasted only ten years that would be a saving of £70,000. The economy through railway competition, though one could not arrive at an exact estimate, might be anything between 6d. and 1s. 4d. per ton on the traffic to the works; but even at 2d. per ton, it would be £2500 a year. The land belonging to the Duke of Buccleuch had been reserved for industrial purposes, and as a feeder for the trade of the harbour. They were practically getting the site for nothing, when they set off the great advantages it would give them for import and export. Witness then detailed the nature of the other works proposed to be carried out.

During Mr. Herring's examination, he stated in answer to a question by the Earl of Carlisle, that the wish of the people in Scotland was to have gas of the higher quality. Personally, he thought it unwise to supply the higher-class gas; but he said it would be unwise to reduce the quality in Edinburgh, because the houses had been fitted up with small pipes for very rich gas, and if the quality were reduced the consumers could not get the requisite quantity through the pipes.

In cross-examination by Mr. Pope, witness said the residual products were sold from the works and sent away by rail in tank waggons. The treatment of these products was not necessarily a "nasty" process; and gas-works need not be the nuisance they very often were if they were not cramped up on unsuitable areas, and managers had the space and the means to prevent them from causing annoyance. He quite agreed that there was a strong sentiment against gas-works, but they must be put somewhere. The Edinburgh works were situated right in the heart of the city, near valuable terraces of houses; and they never had any complaints from the residents as to a nuisance. As to the site at Granton proposed to be acquired, nobody seemed to regard it as a first-class feu for residential houses. He admitted that the property there at present was old residential property of a high-class kind; but judging from the fact that nobody was proposing to take up the land for residential purposes, he could only conclude that it would not be taken up. It was considered a very cold side of Edinburgh, and when there was any fog it rested there. Witness did not admit that there was always an objection to the smell from gas-works; and in illustration of this he mentioned that at Hastings good houses, of a rental of £50 and £70, were built right up to the boundary of the gas-works.

Cross-examined by Mr. Littler, witness said the Corporation were to pay £124,000 to the Duke of Buccleuch for the land, but they were to have the full use of his private railway for £75 a year, and they would probably have 200,000 tons of traffic passing over it. The Duke was also to construct a new line up to their sidings, and the North British Railway would bring their line up to the sidings. He did not consider £1200 an acre too high a price to pay for land for gas-works, looking at the facilities they would have upon it. Speaking generally, it was a high price. Craig-Royston was a very pretty place; but it would not be damaged for many years to come. The Corporation, however, were under the impression that they were doing the least possible inconvenience to anybody by fixing upon this particular site, which he had selected.

Mr. Herring was re-examined by Mr. Balfour Browne. He said that, in selecting the new site, he had no other object than to secure the best one possible in the interests of the consumers. Craigentinny Meadow, near Portobello, had been suggested; but it was not nearly so suitable as the spot chosen at Granton. Having regard to the future, it was desirable that they should have a reasonably large site; and they had not asked for more land than any prudent gas manager would apply for under the same circumstances. They would have entirely new plant, so that they would be able to manufacture gas under the most favourable conditions, and avoid nuisance to the surrounding property. As they would be able to work up the residuals on the spot, they would get more profit from them; and it was his hope that they would be in a position to reduce the price of gas. Taking all these things into account, he did not believe there would be any nuisance to the surrounding property. The Commissioners were looking ahead, and they would gradually cover the ground as the consumption of gas increased.

Mr. George Livesey was next called. He said he visited the works last November, and inspected the suggested sites at Granton and Craigentinny. In his opinion, the former was incomparably superior to the latter. The advantages of the Granton site were the two railways and the proximity of the docks for getting coal in and refuse away. The sea access was also a valuable feature of the site. He was satisfied that with improved works and a better situation the saving would be considerably more than sufficient to pay interest on the loan and leave a surplus for the benefit of the consumers. Under the Scottish system, these were treated fairly, as any surplus went to them; but under the English system it often went to the ratepayers, which he considered most unfair. It was in the interests of the consumers that the Commissioners should acquire a reasonably large site such as was proposed. It was perfectly marvellous to him how they dealt with their residuals on the present restricted area. The quantity of refuse that had to be got out of the works every day was so enormous that nothing but the very best management could avoid hopeless confusion. In recent years, the plant for gas manufacture and the working up of residuals had been very considerably improved, and the nuisance had been reduced to a minimum. The site of the proposed works had ceased to be a residential district, and was becoming rapidly manufacturing. He should think there would not be any greater nuisance to the owners of property from the existence of gas-works there than there would be from any other public works.

In cross-examination, witness admitted that people living within 300 yards of gas-works might find the smell objectionable; but chemical-works were, he said, infinitely worse than gas-works. The manufacture of sulphate of ammonia created no nuisance whatever; and the distillation of coal tar could be carried on without causing any.

Mr. Livesey was followed by Mr. Corbet Woodall, M.Inst.C.E., who stated that ten years ago he came to the conclusion that the Edinburgh Gas-Works ought to be removed from their present site; and it had been the misfortune of the city that this had not been done. He corroborated the evidence given by Mr. Herring and Mr. Livesey as to the suitability of the Granton site for the new works, the importance of the railway and sea communication, and the advantage of the extent of the area proposed to be acquired. He said he was acquainted with gas-works which were very extensive, and yet when passing their boundary it was impossible to know of their existence. If there was any nuisance to adjoining proprietors, it was diminished by giving to the gas undertaking a larger rather than a smaller area.

Mr. Hamilton Beattie, an architect in Edinburgh, expressed his opinion that the district in which the proposed site was situated was not a residential one, and that the amenity of Craig-Royston would not be destroyed by the works proposed in the Bill. On the contrary, its value for feuing would be increased. Mr. B. Hall Blyth, M.A., M.Inst.C.E., corroborated this evidence. Mr. Cameron, another architect, and a member of the Town Council, said the Granton site was an excellent one for gas-works; but at the same time he thought Craig-Royston would be injured as a residence. There would, however, be compensation in the improved value of the ground belonging to the estate. The effect of the gas-works on Muirhouse (Mr. Davidson's place) would be practically *nil*. Bailie Kinloch Anderson, the Chairman of the Works Committee of the Gas Commission, said the price they had agreed to pay for the land was no more than its fair commercial value. He had personally examined six different sites, and the one selected was unquestionably the best, and was decidedly cheaper than the others. He did not admit that the gas-works would injure the value of Craig-Royston as a residential property; but if Mrs. Dundas sustained damage, she would be entitled to claim compensation under the Lands Clauses Act, and the Gas Commissioners would be prepared to consider the matter. The Craigentinny site would have interfered very much more with residential property near it than the Granton one. Sir Andrew M'Donald, ex-Lord Provost of Edinburgh and a Gas Commissioner, also gave corroborative evidence as to the suitableness of the latter site for the new gas-works, and as to their erection thereon causing the minimum of residential injury. Then Mr. Herring was recalled, and explained to the Committee, by means of a

plan, the way in which he proposed to utilize the site. Mr. R. Streathern, the agent and legal adviser to the Duke of Buccleuch, said he had instructions from his Grace to put on the market the whole of the land in question at Granton, for the erection of industrial works. There was no justification for saying that the Duke obtained the price of £124,000 because of any possible damage to the rest of his property by the existence of the gas-works there. Far from this, he might say that since it became known there had been applications for sites for the erection of tradesmen's residences. Dr. Stevenson Macadam gave evidence to the effect that it was not at all necessary that gas making should be a nuisance to a locality. The first factor for proper gas manufacture was, he said, to have ample space for the works. There was not one of the possible nuisances in the manufacture of gas and the working up of the residual products that could not be prevented by the adoption of modern methods. Professor Dewar, F.R.S., supported these statements.

This closed the case for the promoters; Mr. Balfour Browne stating, on their behalf, that they were willing to be placed under an obligation not to erect works nearer than 300 yards of their boundary for ten years.

The case of Mr. Davidson was then heard. He and a number of other witnesses were examined; and Mr. Pope spoke in support of the petition. The point of the case was that the estate was a very beautiful one; that its beauty had been generally recognized; and that the proximity of gas-works to such an estate would of necessity do it great damage.

Evidence followed in support of the petition of Mrs. Dundas. The first witness called was Mr. G. Gordon, land valuer of Inverness, who said the proposal of the promoters was to divert the public road and make it run parallel to the Craig-Royston avenue. The erection of gas-works would be practically ruinous to the house; and the proposal to restrict the works to the west side of the public road would not remove his objection. When the spent lime was tipped in the months of April, May, and June, during which the wind was usually easterly, the fumes would all be blown in the direction of the house, and would, he believed, injure all plant life. The sea-wall, too, would quite destroy the view from certain portions of the estate. Mr. Pember asked witness whether, if the ten-years clause were extended so as to specify that no spent lime should be tipped to the west of the road, this would meet his views. Witness replied that it would not, but that a clause prohibiting the tipping would be an improvement, and would lessen the objection. He saw no way of getting rid of the objection entirely except by buying out the proprietor of Craig-Royston, because with the gas-works erected he (witness) believed the house would become uninhabitable. Mr. A. Belfrage supported the preceding witness; as also did Mr. Hippolyte J. Blane, who said the proper course for the Commissioners to take was to buy Craig-Royston out and out. Mr. W. Welsh, a landscape gardener, said the effect of the proposed gas-works would be most injurious on the plants and shrubs on the estate; and Professor Aitken had no doubt that great gas-works erected on the proposed site would be very detrimental to the amenity of Craig-Royston, and would ruin it as a residential property, in spite of the chimney carrying off the gases.

This closed the case for the opposition.

Mr. Littler then addressed the Committee on behalf of Mrs. Dundas, and contended that in a case of this kind, where promoters were deliberately going to a place to inflict an injury, the proper course to take was to buy out the parties affected. But they did nothing of the kind. They stood at arm's length, and asked the Committee to allow no compensation. If the Committee were of opinion that the Bill should be allowed to proceed, surely it ought to be on condition that the whole estate was bought. Whether the damage was to be postponed for ten years or not, the land would have the mark of the gas-works upon it as soon as the Bill was passed. He submitted that the scheme was ill-considered.

Mr. Pember, replying for the promoters, denied that the Commissioners had selected the Granton site without reference to any other consideration than that it seemed a good one. Before it was fixed upon, the Commissioners went all round Edinburgh, Leith, and the neighbourhood, and inspected no less than ten sites. This was the one which combined every possible advantage with the minimum of disadvantage. The ten-years limit should certainly remove all objection to the Bill so far as the present occupant of Craig-Royston was concerned. The promoters had not swerved from the clause they offered to insert, which would come as a proviso to clause 5, and run: "Provided always that the Commissioners shall not, without parliamentary authority, to be obtained in a future session of Parliament, but not sooner than ten years from the passing of this Act, construct any gas-works or works for the manufacture of residuals to the west of the road intended to be stopped up under this Act." To that clause he was willing to add, "or tip spent lime to the west of the road," so that the great fear as to injury therefrom would be removed. He could not see what more was wanted. As to the question of compensation, the law was this—that when land was not taken, a claimant had still a right, under section 68 of the Lands Clauses Act, to claim damage for the construction of the works in question; but if land was taken, then a claimant could go into matters before an arbitrator, which he could not otherwise do. If the gas-works would injure the lands of Craig-Royston for feuing, this would be damage from construction; and the law could be applied.

The Committee conferred together for a short time in private, after which the Chairman declared the preamble of the Bill proved, with the introduction of the clause which had been handed in. On the adjustment of clauses, Mr. Pollock asked permission to bring up clauses for Muirhouse and Craig-Royston; but the Chairman said the Committee had considered the question of compensation, and had decided to pass the preamble of the Bill without giving any.

The Committee then took up the consideration of the

STIRLING GAS BILL.

The objects of this Bill are to dissolve and re-incorporate the Stirling Gas Company, with power to increase their capital and extend their limits of supply. The Corporation of Stirling were the only opponents; and they objected to the Bill on the ground that it would enable the Company to increase the cost of gas, augment their capital unnecessarily, and not leave the Corporation the power of acquiring the gas undertaking under the Burgh Gas Supply (Scotland) Act, 1876, except at an altogether unreasonable price.

The case for the promoters was conducted by Mr. Pembroke Stephens, Q.C., Mr. Dundas, Q.C., and Mr. Neilson; the Corporation being represented by Mr. Blennerhassett, Q.C., Mr. Rigg, and Mr. J. Todd.

In opening the case for the promoters, Mr. Pembroke Stephens explained that the Stirling Gas Company as at present constituted had lighted the town for the last fifty years; and that their application was one of the ordinary character made by private companies desiring statutory powers. They were now free from the control of Parliament; but, on the other hand, they had no protection from it. They had no power to break up the streets, and could only do so by permission of the governing body. On the other hand, if the latter refused this permission, the town might be put in darkness. The consumers had no control over the Company, and the latter did not work under penalties. They were under no conditions as to raising capital, the price to be charged, the amount of profit they might make, or the illuminating power of their gas; so that, though in one sense they were in a position of weakness, in another they were in a state of absolute freedom. The population they served was between 22,000 and 23,000. The Company was formed in 1825, and amalgamated with a competing Company in 1845. The capital in the former year was £6200; that of the amalgamated Company, £12,400. The business had developed from 4½ million cubic feet supplied, to 67½ millions last year. The profits, also, instead of being reckoned by a few hundred pounds, were last year £2600. Originally the price the Company supplied gas at was 6s. 6d. per 1000 cubic feet; whereas now it was 3s. 4d. The works were well situated for their purposes, as they adjoined the railway; but expenditure was necessary in order to modernize them. The Company therefore proposed, having, during the past fifty years, applied surplus revenue to some extent to expenditure on works, to raise the capital necessary for all further improvements. It was provided by the Bill that the original capital should be taken as £40,000. They only desired the maximum dividend allowed by Parliament on £30,000 of this, and on the balance of £10,000 they would take only 5 per cent. As to the future, the Company now asked the sanction of Parliament for the raising of £10,000 more capital upon which also the dividend would be limited to 5 per cent. As to the quality of gas to be supplied, they proposed to fix it at 22-candle power. With regard to price, while they did not purpose raising the present charge of 3s. 4d., they asked, in view of the risk of strikes, for a maximum of 3s. 8d., with the sliding-scale. With regard to the opposition of the Corporation, it was a question how far it was a meritorious one. The proceedings in Parliament last year had somewhat cleared the air as to the issues between them and the promoters. It had settled the question of purchase, and he did not well see how this question could be revived. During the long period—more than half-a-century—the Company had been in existence, they had not shown any particular desire to part with their undertaking. But the Corporation had twice asked them to sell, and on both occasions the negotiations had failed to accomplish the object. There was no doubt that last year, when the Corporation were in Parliament with a Purchase Bill, there was a very strong feeling in the community against the purchase of the property at the price fixed by the Arbitrator (Sheriff Lees)—viz., £62,697. But since the Bill was thrown out, they had taken no action of any kind to acquire the Company's undertaking.

Evidence in support of the Bill was then called. The first witness was Mr. D. Chrystal, the Company's Agent in connection with the present application. He stated that, for its population, Stirling was a very prosperous town. The burgh valuation last year was £89,440. The town was growing towards the south and west. The whole area of the burgh was at present lighted by the Company; and they also lighted certain outlying districts. The estimated population of the area the Company supplied was 23,000. Having given particulars of the early history of the Company, witness said that in 1874, the Corporation approached them with a view to purchase; the price they offered being 9 per cent. annuities on a capital sum of £15,000. Witness had obtained an actuarial valuation of the worth of such annuities at the time the offer was made and now; and the figures were £33,760 and £45,000. The offer was unanimously rejected as quite inadequate. In 1874, the Corporation obtained a valuation of the works from Mr. Laidlaw, of Glasgow, who fixed their capital value at £24,000. In 1878, the Company themselves employed Mr. Laidlaw; and he then found that more than £15,000 had been spent out of profits. The original capital of upwards of £14,000 had thus been more than doubled; and he advised the Directors that the value of the shares should be doubled. Accordingly, the Company unanimously resolved that the face-value of the shares should be altered from £2 to £4. The capital was thereupon raised to £29,772, at which it now stood. Witness pointed out that every overture for purchase had come from the Corporation. He explained in detail the negotiations which took place at the end of 1896; the arbitration before Sheriff Lees, which resulted in the latter fixing a sum of £62,697, as against £61,000 offered by the Corporation and £68,000 asked for by the Company; and the Bill subsebuently brought in by the Corporation asking power to acquire the works at the price fixed by the Arbitrator. He said there was a strong feeling among the ratepayers that the price was too high; and in consequence the Bill was thrown out. There had been no further offer. The present Town Council contained a majority opposed to the policy of the Corporation of last year. The Company had throughout the negotiations endeavoured to treat the Corporation with fairness and consideration, as representing the ratepayers. In the present Bill, they had restricted the capital to £42,000. On £29,722 they asked for 10 per cent., the usual maximum allowed; on the balance, 5 per cent.; and on the new capital, a uniform rate of 5 per cent. The Corporation, in their petition, asked that they should be allowed more time to consider the question of purchase. But they had been considering it since 1874. They had a Provisional Order for the introduction of the electric light; and he did not think they were likely to buy the Company. They were, nevertheless, trying to make them go on with effete and imperfect works, which was bad even for the ratepayers. The subject had been so much considered, that the people were nauseated with it.

In cross-examination, witness said the capital actually subscribed was more than £14,000. The rest represented profits earned, and applied to capital purposes. Even if the Corporation had not opposed the Bill, the Company would have modified their request to have the capital fixed at £59,000, and would have substituted, as now, the figure of £40,000. It would not be to the interest of the Company to put a suspensory clause into the Bill in order to enable the Corporation to raise at the next November elections the question whether or not they should adopt the Burghs Gas Supply Act. From the public utterances of members of the

Council, he did not believe they had any *bonâ fide* intention to purchase the gas-works on fair terms.

At this point, the Chairman asked whether the opposition of the Corporation would cease if a suspensory clause were put into the Bill. Mr. Blennerhassett said it would. The Corporation asked the Committee to reject the Bill or put in a suspensory clause. Lord Stamford inquired whether, supposing the Corporation adopted the Act mentioned, and there was an arbitration, and an award of (say) £70,000, the Corporation could "wriggle out of it." Mr. Blennerhassett said they could not; they would be bound to accept the arbitrator's award.

The next witness was Mr. Joseph Hepworth. He said his opinion was that the Bill gave advantages both to the Company and to the consumers. His calculation of the cost of construction of the works was £41,000; and they would be improved by the introduction of new plant. He approved the proposals of the Company with reference to the introduction of the sliding-scale and the illuminating power of the gas to be supplied. The Bill fixed the latter at 22 candles; but he would recommend the Company to work up to 24 candles, so as to avoid the risk of coming under penalties. Mr. Hepworth was followed by Mr. J. A. Robertson, who stated that a report prepared by him showed that up to May, 1896, the Company's capital expenditure had been £39,606, after providing for depreciation and the proper maintenance of pipes and meters. Mr. Corbet Woodall, M.Inst.C.E., also gave evidence, in the course of which he offered a suggestion that the standard price should be 3s. 6d. instead of 3s. 8d., and that there should be no increase of dividend until the price was reduced below 3s. 4d., the present charge.

On behalf of the opponents, Mr. Alfred Lass, F.C.A., gave evidence based on an investigation of the figures and tables compiled by Mr. Millar, who had been engaged by the Corporation in the arbitration proceedings referred to, and who had had full access to the Company's books. He, however, could not appear before the Committee. The effect of witness's evidence was that, in the circumstances of the Company, £40,000 seemed an excessive amount of capital to authorize. Mr. E. H. Stevenson, M.Inst.C.E., and Mr. W. R. Herring were also called by the opponents to show that the amount of capital applied for was too large, and that the standard price of gas fixed by the Bill was too high. In their opinion, if the Bill was not rejected, a suspensory clause should be inserted to the effect that the Corporation should have the option within a year to take over the undertaking under the Burghs Gas Supply (Scotland) Act of 1876. Mr. Buchanan, a member of the Corporation, produced a resolution of the Town Council that they should proceed to the acquisition of the Company's property under this Act.

Mr. Blennerhassett urged the Committee to allow 10 per cent. only on the capital of the Company actually subscribed, and 5 per cent. on the remainder; not to sanction a standard price exceeding the present charge for gas—viz., 3s. 4d. per 1000 cubic feet; and, either by rejecting the Bill altogether or by inserting a suitable clause in it, to preserve to the Corporation their present right to acquire the gas undertaking either by agreement or by arbitration under the Burghs Gas Supply (Scotland) Act. He pointed out that the opposition of ratepayers to the Bill of last session was not in regard to acquisition, but to acquisition at an extravagant price; and that the continuous policy of the Corporation was to acquire the undertaking on reasonable terms in the interests of the community.

At the close of Mr. Blennerhassett's speech, the Chairman, without calling on Counsel for the promoters, had the room cleared. On the parties being re-admitted, the Chairman said the Committee found the preamble of the Bill proved, but they were not quite satisfied with that portion of it which set forth the decree of Sheriff Lees in the arbitration conducted by him, fixing the price of the undertaking at £62,697. Mr. Pembroke Stephens said this had been put into the Bill merely as history, and was not vital to it. Thereupon the clause was struck out.

After some further consideration, the Committee announced that they had determined to leave the capital as proposed in the Bill. As to the standard price, they would accept Mr. Woodall's suggestion. The illuminating power would be left as it was in the Bill. The Committee would not introduce the suspensory clause asked for by the Corporation.

Thereupon the clauses were adjusted; the opponents, however, taking no part in the process.

HOUSE OF LORDS COMMITTEE.

Before the Earl of LAUDERDALE, *Chairman, the Duke of* BEDFORD, *the Earl of* DARTREY, *Viscount* BANGOR, *and Lord* SEATON.)

The above-named Committee—to whom had been referred the Aberystwith Gas Bill, the Redhill and Reigate Gas Bill, the Yeovil Corporation Bill, the Yeovil Gas Bill, and the Swansea Gas Bill—concluded their sittings on the 21st inst. The Aberystwith and Redhill Bills having been disposed of as reported last week (p. 652), the Committee proceeded with the

YEOVIL CORPORATION BILL AND YEOVIL GAS BILL.

By the first of these Bills, the Yeovil Corporation sought power to construct additional water-works and to purchase the undertaking of the Yeovil Gas Company and supply gas. The Bill was opposed by the Company, who also promoted a Bill asking for re-incorporation with statutory powers to supply gas in the parishes of Yeovil, Yeovil Without, Preston Plucknett, and Barwick, or some or any of them. The Company also asked power to convert, consolidate, and increase the nominal amount of their existing capital, and raise further money for extension of works.

Mr. Worsley Taylor, Q.C., Mr. Moon, and Mr. Thesiger appeared for the Corporation; Mr. Balfour Browne, Q.C., Mr. Freeman, Q.C., and Mr. Lloyd represented the Company.

In opening the case for the Corporation, Mr. Worsley Taylor said the only question for their Lordships to consider in the present Bill was whether or not the Corporation should have power to purchase the Gas Company's undertaking. The population of the borough of Yeovil and the district was steadily increasing. The Company were not working under statutory powers, and therefore they were not controlled by the Gas-Works Clauses Act. A Company for lighting Yeovil with gas was started in 1833 under a Deed of Partnership, and either that Company or another into which it was merged was subsequently registered under the Companies Acts. The present capital was about £20,000. In another Bill which he understood was before their Lordships the Company were asking to be dissolved and re-incorporated with statutory powers and obligations. They proposed that their original capital of £20,000 might be represented by £40,000 of 5 per cent. stock, and they sought permission to raise £30,000 of new share capital and £7500 on loan—making a total new capital of £37,500. It was under these conditions, when the Company were seeking an entire change in their status, that the Corporation, representing the inhabitants of Yeovil, came forward and asked that the gas undertaking might be transferred to them. The duty of lighting—at any rate, as far as the public thoroughfares were concerned—was one primarily laid on the Local Authority; and it was in the interests of the inhabitants that the lighting powers should be under the control of the Corporation. Under the Public Health Act, the Corporation had the right to light the streets now; and if their Bill were rejected, it would be taking away from them the power they already possessed, while the value of the Gas Company would be greatly enhanced against the interests of the ratepayers. Compared with other corporations which came under the general law, Yeovil was in a peculiar position, for in its case the law was anticipated by the Yeovil Extension and Improvement Act, 1854, section 46 of which gave the Corporation power to erect gas-works for the purpose of supplying the streets. When the present works were put up, they were outside the town. The town, however, had greatly extended around them; and it was found that they were now a considerable nuisance to the people living in the neighbourhood. It was thought that, by the exercise of greater care in the manufacture of gas, the Corporation could considerably abate the nuisance. Moreover, they had acquired a good site for gas-works outside the area of population. On the ground of precedent and general policy, when a corporation came to Parliament for power to purchase a non-statutory undertaking, even though there were no complaints in regard to the pressure, quality, or illuminating power of the gas supplied, or as to the financial arrangements of the company concerned, the request had been granted by Parliament if the purchase could be carried out without injustice to the company. By the present Bill it was proposed that the transfer should be made under the Lands Clauses Act. If the Corporation and the Company could not agree as to the purchase price, they would, under that Act, go before an arbitrator, who would give the Company the full value of their undertaking. The Company would also be able to claim something for compulsory purchase. On behalf of the Company, Mr. Balfour Browne pointed out that the Bill left the purchase at the option of the Corporation for two years. But Counsel for the Corporation said they were willing to alter this to six months.

Evidence was called to show that a large majority of the Corporation were in favour of the acquisition of the gas undertaking, and that public meetings had been held in favour of the proposal. Mr. H. F. Raymond, a member of the Town Council, stated that the Corporation obtained an Act in 1870 empowering them to compulsorily purchase the gas undertaking within three years; but the project had not been proceeded with because the Corporation then had in hand a water scheme, and it was thought the two undertakings might be too heavy a burden on the ratepayers at the one time. The water undertaking had proved very successful. Mr. E. H. Stevenson, M.Inst.C.E., said the works were in very good condition, and were considerably in excess of the present requirements. There was nothing against the site except that the town had grown up around it, and the effluvium from the works was a nuisance. It would be impossible to enforce the removal of the buildings unless the Corporation obtained their Act. The effect of giving a non-statutory company statutory powers was to increase the selling value of the undertaking from 20 to 25 per cent. There were the three recent cases of Matlock Bath, Cowes, and Whitwick, in which Parliament had permitted the purchase by the respective Local Authorities of non-statutory Gas Companies' undertakings without special circumstances being alleged against the Companies. Up to the decision in the last-mentioned case (see *ante*, p. 654), he had thought that some special circumstances—such as bad gas or bad management—must be alleged against a company to justify transfer; but the Whitwick decision showed that the simple desire of the local authority of the district to purchase was considered sufficient.

In support of the Company's Bill, Mr. Balfour Browne said that in the petition against the Bill there was not one substantial complaint against the Company. So far as the evidence of Mr. Stevenson was relevant, it went to show that the works were in very good condition; that there was an excess over present requirements; and that there was nothing against the site except that it had become a little crowded. He asked their Lordships to hesitate before they said that, as a matter of general policy, a gas company who had been doing their duty exceedingly well might be expropriated merely because the local authority desired it. The Yeovil Gas Company, formed in 1833, was registered in 1881 under the Companies Acts with a capital of £20,000. Since 1881 they had been able to pay 10 per cent. There was no limit to the dividend which a company like this might pay. In the case of the Reigate Company, which had been before their Lordships (see *ante*, p. 652), it was shown that they had not only divided 10 per cent., but had given a bonus of 2 per cent. to the shareholders, and accumulated a reserve fund of £9000, which all came out of the pockets of the consumers. The Yeovil Company, however, who could have acted in exactly the same way, had done nothing of the sort, but had gone on just as if they were under statutory obligations, and had spent large sums out of revenue on capital account. By their Act of 1854, the Corporation had power to purchase the gas-works; and the Company were then willing to sell. In 1870 the Corporation obtained another Act which gave them compulsory powers to purchase within three years; but in neither case had the Corporation exercised their powers. It would be unfair to allow compulsory purchase in this case, because the Company had spent large sums of money in anticipation of future requirements. There was no general principle by which all gas companies were to be transferred to local authorities. If there were, such a principle would be embodied in a General Act, and compulsory purchases would not be carried out by means of Private Bills. When the Sheffield Water Company, having been allowed an increased rate after the bursting of the Dale Dyke reservoir, came to Parliament for an extension of the time in which they might charge the rate, the Corporation of Sheffield appeared in opposition, and asked for the transfer of the undertaking to them. The late Lord Derby, who was Chairman of the Committee before whom the parties

appeared, passed the Bill of the Corporation, not on the ground of complaints, but on that of general policy. On the third reading of the Bill in the House, the Duke of Buckingham and Chandos and Lord Morley (the Chairmen of Committees) both entirely dissented from the principle Lord Derby had laid down, and pointed out that general policy should be carried out by general legislation. Every case must therefore be heard on its own merits; and if the Yeovil Company had been careful to guard the interests of the gas consumers in their district, they ought not to be swept away. They had been threatened over and over again. On the strength of the Corporation allowing the power conferred upon them in 1870 to lapse, the Company had spent a large sum of money in constructing surplus works; and if they were now bought out, they would not have had time to reap the benefit of their outlay. As it stood, the Bill of the Corporation was absolutely unfair. It contained a clause that the Company were to pay all outstanding liabilities. Under the Bill, no alteration was proposed in the price, pressure, or quality of the gas; and the consumers would in this respect be in precisely the same position as they were now, except that there would be nobody to keep a watch over the Corporation. They did not even propose to move the works, though they had acquired another site.

Evidence was called to show that the gas-works had been well managed, and that the price compared favourably with that charged in other towns of the same size. Mr. S. Wood, of Messrs. Alfred Lass, Wood, and Co., said that the amount expended out of revenue on capital account between 1888 and 1897 came to £23,135. Issues of capital had been made at premiums amounting to £2293, which had been spent on capital account. Mr. Thomas Newbigging, M.Inst.C.E., said the increase in consumption had averaged more than 7 per cent. for the last three years. He did not know a town in England that was better lighted than Yeovil. He estimated that the capital asked for by the Company would last about fifteen years. The only justification for the transfer of the undertaking to the Corporation would be the prospect of a rise in the price of gas. He objected to a Corporation making a profit out of the gas consumers for the relief of the ratepayers. He felt very strongly that when the Gas and Water Acts were passed, Parliament intended not only to enable non-statutory companies to put themselves under parliamentary regulations, but to encourage them to do so. Now, if they applied for statutory powers, they were very often handed over to the local authority. Mr. Corbet Woodall, M.Inst.C.E., also gave evidence strongly in favour of the Company.

Addressing the Committee in support of the Corporation Bill and against that of the Company, Mr. Moon said the object of the latter Bill was to increase the selling price of the gas undertaking by 20 or 25 per cent. The wishes of the population were a very strong reason why the Company's undertaking should be transferred to the Corporation. If the Company's Bill were passed by the Committee, he asked for the insertion of a purchase clause.

After a short consultation, their Lordships unanimously came to the conclusion that the Bill of the Corporation might proceed, but that the shareholders of the Company must be sufficiently protected in regard to the present value of their property, if it should be taken over by the Corporation, by the insertion of a clause dealing with the question of purchase. The Committee reported that it was not expedient to proceed further with the Company's Bill.

The clauses of the Corporation Bill were then gone over, revised, and amended; the purchase clause being left over for arrangement. On again coming before the Committee, Mr. Balfour Browne suggested that the following amended clauses should be introduced on behalf of the Company:—

3.—The expression "the undertaking of the Company" includes all the gas-works, engines, mains, pipes, and machinery, lands and buildings, plant, and all the rights, powers, and privileges vested in or belonging to, or had or enjoyed by, the Company at the date of the transfer of the und rtaking of the Company to the Corporation under the provisions of this Act, save and except (1) the cash balance other than consumers' deposits in the Company's hands or in those of their bankers or agents on the day of the transfer, and all sums standing to the credit of their reserve fund, and all stock-in-trade and stores, and (2) all rents and profits of, and all book and other debts due to, the Company, and all rates accrued due on the day of the transfer, and the books and papers relating exclusively to the shareholders in and the constitution of the Company.

18A.—(1) The Corporation shall, within six months after the passing of this Act, by notice in writing under their seal, require the Company to sell and transfer to the Corporation, and the Company shall thereupon sell and transfer to the Corporation, the undertaking of the Company, upon such terms and conditions as may be agreed upon between the Company and the Corporation, or, as failing agreement, shall be determined by arbitration in manner provided by the Lands Clauses Acts; and, in the event of such arbitration taking place, the arbitrators and umpire shall, in settling the amount of compensation to be paid by the Corporation to the Company, have regard to, and make allowance for, the capacity of the works and plant being in excess of the requirements of the Company, and sufficient to meet future requirements. (2) In addition to the sums to be paid by the Corporation to the Company under the foregoing provisions of this section, the Corporation shall, on or before the first day of January, one thousand eight hundred and ninety-nine, pay to the Company the costs and expenses incurred by them preliminary to, and of and incident to, the promotion by them of their Bill in the present session, and their opposition to the Bill for this Act; and the Corporation shall also pay all the costs and expenses of and incident to the transfer of the undertaking of the Company and the winding up of the Company. (3) The Corporation shall also pay compensation to any officers and servants in the regular employment of the Company who shall not be retained by the Corporation in the same or similar office or employment, and at the salary and on the terms and conditions in at and on which they respectively were employed by the Company at the passing of this Act. In respect of any loss of office or diminution of salary or income, by reason of the transfer of the undertaking of the Company to the Corporation, the amount of such compensation, in default of agreement, to be determined by arbitration as aforesaid; and no officer or servant who has been in the employment of the Company for fourteen years or upwards shall lose his right to compensation as aforesaid by reason of his declining to continue in the service of the Corporation. (4) The Company shall be entitled to, and shall retain, all sums standing to their credit at any bank or otherwise, and all sums standing to the credit of their reserve fund, and all cash in hand; and shall also be entitled to receive and recover all debts accruing due to the Company up to the time of the transfer. (5) The purchase shall be completed, and the transfer shall be carried into effect, within three months from the date of the award of the arbitrator, or at such earlier date as may be agreed in the event of an arbitration not taking place. (6) The Corporation shall pay to the Company such a sum as shall be agreed between them, or be determined by valuation, for the stock-in-trade of the Company as it stands on the day of transfer.

On behalf of the Corporation, Mr. Moon urged that the arbitrators should be allowed to inquire whether any surplus plant was in existence, and take note of any obsolete and useless apparatus. He also objected to the Council paying all the costs of the Private Act, because the Corporation had always been willing to meet and treat with the Company for their works.

The Chairman said the Committee had agreed to pass the clauses as proposed. They considered they had to deal liberally with the Company, as the Corporation were compulsorily acquiring their property.

The Committee then proceeded with the

SWANSEA GAS BILL.

This Bill was promoted by the Swansea Gas Company to obtain power to consolidate and increase their capital, and carry out arrangements in connection with the general working of the undertaking. The Company was formed as long ago as 1830, with a capital of £6000 of stock and £3000 of debentures, to supply gas to the town of Swansea. In 1861, the Company was re-incorporated with a capital of £100,000, and borrowing powers of £25,000. They were authorized to supply gas within the town and parish of Swansea, the parish of Oystermouth, and all places within a mile of any part of the borough. In this Act, there was a clause reserving to the Council the right at any time to commence and carry on gas-works and supply gas to the town. In 1888, the Company obtained a Provisional Order by which their capital was increased by £50,000 stock and £12,500 loan capital; and in this Order no mention was made of the Council's right to construct gas-works. The capital of the Company was, therefore, at the present time £6000 in original shares, bearing interest at 10 per cent.; £94,000 created by the Act of 1861, bearing interest at 7½ per cent.; and £50,000 created by the Provisional Order of 1888, bearing interest at 7 per cent. In addition to this were the authorized loan issues of the Company—£25,000 created by the Act of 1861, and £12,500 by the Provisional Order of 1888. This capital of £187,500 the present Bill proposed to consolidate into a new stock of £202,000 bearing interest at the rate of 5 per cent. It was also sought to increase the capital by the sum of £120,000, with borrowing powers to the amount of £30,000; the object of this being to purchase additional land, to renew and improve the plant and buildings, to introduce automatic meters, and to supply on hire gas stoves and fittings. The Company sought, in addition, to reduce the rate of interest on deposits from 5 to 4 per cent. per annum. The only opponents were the Corporation of Swansea, who petitioned against the Bill, and appeared by Counsel. They alleged in their petition that the Company had no necessity to acquire the lands proposed to be taken, nor to consolidate and increase their share capital, which the petitioners thought would be injurious to the gas consumers of the district. They objected to the sliding-scale proposed in the Bill, and urged that if such a scale were adopted, the standard price should be fixed below the present selling rate. They also objected to the proposed reduction of the interest on deposits, and contended that the gas supplied was of very inferior quality and deficient in illuminating power. They asked for greater facilities for testing the gas, for the provision of a central testing-station at some distance from the works, and for the appointment of an independent auditor. They also sought that a clause should be inserted in the Bill saving all their rights, and in particular "the right which they possess to construct gas-works;" and as it was now well recognized that the gas supply of a town should be in the hands of the local authority, they asked that a clause should be inserted in the Bill empowering them to purchase and requiring the Company to sell their undertaking on equitable terms.

Mr. Balfour Browne, Q.C., Mr. Allan Statham, and Mr. Moon appeared for the Company; Mr. Pember, Q.C., and Mr. H. Lloyd represented the Corporation.

On the Bill being reached, Mr. Balfour Browne asked the Committee to postpone consideration of it as application had been made to the Court of Chancery, on Friday and Saturday last, to restrain the Corporation from spending the money of the borough in opposing the Bill. There had not been a meeting of ratepayers on the subject, as required by law; and consequently the Corporation were not entitled to spend the borough funds in opposition to the Bill. He asked, therefore, that the consideration of the measure should be postponed, as the decision of the Court would not be given till Friday. They had arranged to see the Chairman of Committees (Lord Morley) that day, to ask him if he could put the Bill in another group. Mr. Pember objected to the postponement, and said the Corporation would oppose the Bill in any circumstances. The learned Counsel quoted decisions to prove that, as ratepayers, the Council could appeal; and the only question was whether the borough funds could be used to pay the expenses. The Chairman said the Committee would adjourn till two o'clock, so as to give the parties the opportunity of seeing Lord Morley. At one o'clock the interview took place; and after some discussion, Lord Morley decided that the Bill should be proceeded with.

The case for the promoters was thereupon opened by Mr. Moon, who explained the method in which they proposed to consolidate the capital of the Company, and urged that as they had now expended all their authorized capital, and had contracted various debts to the amount of nearly £25,000, it was absolutely necessary that the capital should be increased. He urged that the Company had been economically managed, and to the interests of the consumers in the district. Before 1861, the maximum price of gas was fixed at 4s. per 1000 cubic feet within the borough, and 5s. 6d. outside. The Act of 1861 authorized them to supply gas beyond the old limits; and the maximum price was fixed at 3s. 6d. per 1000 cubic feet within, and 5s. outside the borough. But they had never charged the maximum price; the rate having been 3s. 4d. per 1000 cubic feet in 1894, 3s. 2d. in 1895, and 3s. in 1896, at which figure it still remained. Outside the borough, they charged 3s. 4d. per 1000 cubic feet at Skelly, and 3s. 6d. at the Mumbles, which was nearly nine miles from the works. It should, however, be remembered that the mileage of mains was considerably greater in Swansea than in other towns. The Company had to extend their mains through many streets where the only consumption was for the lighting of the public lamps; and when the borough

boundaries were enlarged in 1881, they had been put to considerable expense in extending the service, and with little resulting revenue. The town did not compare favourably in the matter of consumption with other places. They had 85 miles of mains, and the annual consumption per mile was only 2,700,000 cubic feet; while in Cardiff the consumption per mile was 5,600,000 cubic feet. From this point of view 3s. per 1000 cubic feet was not a high price, especially when they considered that the consumption was mainly due to large works, and not to the general use of gas by the population. Previous to 1896, the Company had paid their full dividend; but in the year 1896-7, they had not earned the sum necessary to pay the maximum amount. With reference to the complaints of the Corporation as to the quality of the gas, Mr. Moon urged that there was no question that the Company had carried on their business to the general satisfaction of the consumers. Prior to 1888, the standard illuminating power of the gas was 11 candles; in 1888, this had been increased to 15 candles; and at present the standard was 15 to 16 candles. With reference to the proposed increase of capital, the learned Counsel pointed out that £25,000 was needed at once to repay money borrowed, and much would be wanted for the extensions which were immediately required. Then they purposed to expend a great part of the new capital in the introduction of the prepayment meter system, which was not yet in use in the town. Swansea, with a large working-class population, was they thought a very suitable town for the introduction of such a system. In their town of 100,000 inhabitants, they had only 5189 consumers; while Cardiff, with 170,000 inhabitants, had 14,000 people using gas. The learned Counsel asked the Committee to consider the needs of the Company and pass the Bill.

Mr. Lloyd, for the Corporation, said it might save the time of the Committee if he briefly stated the objections of the petitioners. They objected to the increase of the reserve fund and to the proposed sliding-scale. Mr. Balfour Browne interposed the remark that both these proposals had gone out of the Bill. It had also been agreed that the borrowing powers should be only one-fourth, instead of one-third of the share capital of the Company. Mr. Lloyd urged besides that the increase of capital was far in excess of the requirements; that the gas supplied was of bad quality and of deficient illuminating power; that the accounts had been badly kept; and that, in the interests of the consumers, an independent auditor should be appointed. He did not propose to ask the Committee to give them the clause empowering the Corporation to purchase the property of the Company; but he considered that a clause should be introduced into the Bill to protect their right, conceded in the 1861 Act, to construct gas-works. The Chairman said he did not see how they could introduce such a clause. If the Corporation's right, granted by the Act of 1861, had not lapsed by the Provisional Order of 1888, it would not be affected by the present Bill. Mr. Lloyd said the proposed increase of capital was objected to by the Corporation for two reasons—it would enable the Company to augment the reserve fund, and it would also enable them to extend their borrowing powers. Mr. Balfour Browne expressed the willingness of the promoters to agree that the borrowing powers should only extend to the new capital of £120,000. They would also agree that the money raised on loan should not be made into share capital. Mr. Lloyd then went on to urge that the boundaries of the town supply should be extended to the boundary of the borough as fixed in 1889; and he objected to the proposed reduction in the rate of interest on consumers' deposits from 5 to 4 per cent. The Chairman remarked that Mr. Lloyd could hardly carry the Committee with him on that point. They considered that, in these days, 4 per cent. was very good interest. Mr. Balfour Browne said the only questions now between the Company and the Corporation were as to the additional capital of £120,000, the quality of the gas, the claim for an independent auditor, and the revival of the protection clause of 1861.

Mr. Thornton Andrews, M.Inst.C.E., the Engineer and Secretary of the Company, was then called. He said he had held his position since 1856. The works had been maintained in a very efficient state; and in keeping them up they had exhausted all their capital, and had overspent the sum of £24,933. They required additional capital to pay off this debt, and to make many improvements and additions to the works which were necessary. He estimated that nearly £30,000 would be required to meet the present demands of the district, for new purifiers, new scrubbers, boundary wall, offices, coal-stores, trunk main, &c.; and he considered that about £20,000 would be needed within the next three years to introduce prepayment meters. This system was very remunerative. With reference to the quality of the gas, so much of it was used in works and factories that it would not pay them to make it of the highest quality; but the illuminating power had always been up to the standard. The testing-station had been fixed at the gas-works at the request of the Corporation. With respect to the independent Auditor, the present Auditor of the Company was a Chartered Accountant, and was at the same time the Official Auditor of the Corporation.

In cross-examination by Mr. Lloyd, witness said the Corporation in 1844 had a clause enabling them to erect gas-works of their own. The same protection clause was in the Act of 1861; but the original Order of 1888 did not continue the rights to the Corporation. The consumption of gas had been 230 million cubic feet in 1893, and only 229 millions in 1897. There were two reasons for this. Since the crises in 1895, several of the tin-plate works had remained idle; and lately 8000 to 9000 incandescent burners had come into use, reducing the consumption of gas.

Mr. Balfour Browne said he had two or three expert witnesses, but he would not take up the time of the Committee.

Mr. Lloyd then briefly summed up. He was glad that the task of the Committee had been lightened by the concessions the Company had made; but he still urged that the Committee should curtail the amount asked by the Company for additional capital. The Corporation thought the gas should be tested under conditions agreeable to them, and suggested that the Town Hall should be the testing-station. They were willing to provide a room there, with all the necessary apparatus. The consumers could, of course, test the gas where they pleased; but the Company could only be penalized if the gas were found deficient at the official station. The Corporation were also strongly of opinion that an independent Auditor should be appointed, and that the protection clause of the Act of 1861 should be preserved to them.

At the close of the learned Counsel's address, the Chairman said the Committee were against the Corporation on all four points. They found the preamble of the Bill proved.

The clauses, as amended, were afterwards agreed to. The changes in the original Bill are that the clause as to the sliding-scale is withdrawn; the reserve fund is not to be increased on the old capital; the amount to be borrowed is to be one-fourth, instead of one-third of the capital stock, and this borrowing power is only to apply to the new capital; the auction clauses are to apply to the debenture stock; the maximum price of gas is to be 3s. 6d. per 1000 cubic feet within the borough, as it exists at present; and the borrowed capital is not to be turned into share capital.

HOUSE OF LORDS COMMITTEE.

(*Before Lord* Rookwood, *Chairman, the Earl of* Portsmouth, *the Earl of* Carnwath, *Viscount* Barrington *and Lord* Wandsworth.)

MORLEY CORPORATION GAS BILL. MORLEY GAS BILL.

The consideration of the above-named Bills was commenced by their Lordships on Thursday, the 17th inst.

By the first Bill, the Corporation of Morley sought power to purchase, by compulsion or agreement, the undertakings of the Morley and Churwell Gas Companies; to maintain, improve, and extend all or some of the existing gas-works; to supply gas meters and fittings; and to borrow money and extend the periods for repaying loans raised under the existing Acts. The Morley Gas Company by their Bill asked for power to include the township of Churwell within the limits of their supply; to acquire the undertaking of the Churwell Gas Company; to maintain, continue, and enlarge that Company's works; and to consolidate the capital. The Company petitioned against the Bill of the Corporation, the latter body against the Bill of the Company, and the Churwell Company against both Bills; the main point submitted for the opinion of the Committee being whether or not the Corporation should become possessors of the gas-works in the district under their jurisdiction.

The case for the Corporation was conducted by Mr. Balfour Browne, Q.C., Mr. Worsley Taylor, Q.C., and Mr. Squarey; that for the Morley Gas Company by Mr. Pember, Q.C., Mr. Claude Baggallay, and Mr. E. R. Moon; while the Churwell Gas Company were represented by Mr. Pembroke Stephens, Q.C.

On behalf of the Corporation, it was urged by Mr. Worsley Taylor that they were enterprising and progressive; that they had managed their water-works, which had been constructed at a cost of upwards of £150,000, with conspicuous success; and that Parliament might with every confidence entrust to them the control of the gas-works. It was pointed out that the Churwell Gas Company, which is a small non-statutory concern, had, since the Bill was presented, agreed to transfer their undertaking to the Corporation; and it was contended that there was a special reason why there should be only one authority in Morley with power to open the streets—viz., that cement was largely used in paving operations. Another reason put forward in favour of the Corporation's proposal was that, according to the statements of Counsel, there had been certain irregularities in the way in which the Morley Gas Company had dealt with their reserve fund. It was said that an Act obtained by the Company in 1868 did not incorporate the Gas-Works Clauses Act; so that after that date it was irregular to form a reserve fund. In spite of this fact, the Company set aside money year after year as a reserve, so that by 1889 they had a fund amounting to £3059. In 1889, they went to Parliament and obtained power to form a reserve fund; whereupon they said the fund they had already established had been legalized. Again, they had founded an insurance fund of something like £1000, which was another irregularity. There were certain accumulated balances which had clearly come from revenue, but which, instead of being applied to revenue purposes, had gone to the capital account. These things, it was contended, showed the difficulty of checking an independent Company, and the desirability, in the interest of the consumers, of placing the undertaking under the control of a municipal body. There were also complaints as to the quality of the gas supplied. The Corporation already had an electric light undertaking; and the Gas Company maintained that it was inexpedient that the supply of rival illuminants—electricity and gas—should be in the hands of the same body. This was not, it was urged by Counsel, the view either of the Corporation or of the ratepayers. The larger consumers in the town were taking to the use of the electric light very extensively; and consequently the Company would be thrown back more and more upon the small consumers as time went on. These were just the people who could ill afford to pay an increased charge for gas; but it was manifest that the only way in which the Company would be able to recoup themselves for the loss of the larger consumers, and keep up their dividends, would be by raising the price. It was therefore desirable in the interest of the public that the two undertakings should be merged in one.

The first witness called on behalf of the Corporation was Mr. R. B. Hopkins, the Town Clerk of Morley, who gave evidence generally in support of the arguments adduced by Counsel. He had no objection to the Morley Gas Company's present charge—2s. 4d. per 1000 cubic feet—but he was convinced that, owing to competition of the electric light, they would have to raise the price in order to keep up their dividends. At the usual public meeting, held to obtain sanction to the promotion of the Bill, at which fully 600 persons were present, there was an absolutely unanimous feeling in favour of purchase, and a majority of at least four to one in favour of immediate purchase. On the 15th of December last a meeting took place between representatives of the Corporation and the Gas Company respectively; and, as the result, he prepared a draft agreement for the transfer of the works to the Corporation. This he sent to the Chairman of the Company at that gentleman's request; but soon afterwards he received a letter from the Solicitors, stating that the Company were not negotiating for the sale of their undertaking, and that all they were prepared to do was to consider any offer the Corporation might make. In spite of this letter, it had been agreed on both sides that it would be foolish to enter into a costly parliamentary contest if the only question in dispute was the amount of the purchase-money. In view of what passed at the conference, he really did not know what there was between them; and he could not make out why they had been brought to Westminster.

In cross-examination, Mr. Pember elicited from the witness the fact that the Corporation had only been supplying the electric light for a few

weeks, and that hitherto they had charged nothing for it. Counsel remarked, amid laughter, that under these circumstances it was not to be wondered at that so many people were using it; and he suggested that the Corporation had craftily refrained from charging in order that they might be able to assure the Committee that the electric light was being largely employed. The witness, however, explained that the Corporation had power to run experimentally for a few weeks, and to charge the cost to capital. He added that the people who took the electric light had had notice that they would only get it free for three weeks; and he said that, of course, no one would go to the cost of having his premises wired in order to obtain the light for that short period only. He went on to say that the public would be the gainers if the Corporation's proposal were agreed to, because if there happened to be a loss on the gas-works owing to the competition of the electric light, there would be a profit on the latter; and the Corporation would not allow the poor man to pay too much for his gas in order to enable the rich man to obtain the electric light at a cheap rate.

The Mayor of Morley (Mr. C. Scarth) and the Ex-Mayor (Alderman Middlebrook) expressed concurrence with the views stated by the Town Clerk; the Mayor adding, with reference to the meeting on the 15th of December, that willingness was expressed by the representatives of the Gas Company to sell their undertaking, and terms were discussed.

Evidence was then given by Dr. A. Steele, Medical Officer of Health for Morley. He complained strongly about the quality of the gas at present supplied, and said that in his own house, the odour given off by the gas fumes was very objectionable. He had frequently been called upon, as Medical Officer, to investigate bad smells in houses, and had found that they were due to leakages of gas. He thought the purifiers at the gas-works were either not large enough or were not properly used. The illuminating power of the gas was so defective that he could not get sufficient light in his house, though he had tried nearly every kind of burner on the market.

A few other witnesses having been called, the Committee adjourned.

On the resumption of proceedings next day, the first additional witness called on behalf of the Corporation was Mr. C. Beevers, a chartered accountant, who said that, as the result of an investigation of the accounts of the Gas Company, he found that, though up to 1889 the Company were not entitled to create a reserve fund exceeding £1000, they had actually by that date accumulated a reserve of £4089. It appeared to him that this sum had been taken out of surplus profits, and that £3089 ought to have been employed in reducing the price of gas to consumers. He added that in 1895 a new fund—called an "Insurance and Contingency Fund"—was started by a transfer from revenue; and in December, 1896, it amounted to £1000. He could find nothing in the Company's Act to authorize the creation of such a fund. He also discovered that between 1868 and 1889 as much as £4681 had been expended on capital account in excess of the capital raised.

The next witness was Mr. Corbet Woodall, M.Inst.C.E., who expressed the opinion that the present would be an unusually suitable time for the sale of the undertaking to the Corporation. The works were, he said, fully occupied, and the purifiers were actually over-taxed; while it would be almost impossible, without erecting new works away from the present site, to effect the necessary improvements. Of course, the Company did not know what effect the competition of the electric light would have upon them; but if it deprived them of many customers they might later on find themselves stranded with the extensions they would in any case have to make. Mr. Woodall instanced Southampton as a case in point, and said the starting of the electric light there had had the effect of taking away a large number of the Gas Company's customers. In cross-examination, he admitted that the price of gas had gone down in Southampton, and said that the Company had expressly stated that they had reduced the rate more than they would have done, because of the necessity of holding their own against the electric light. The result had been that during the last few years the Southampton Gas Company had not earned their dividend. The dividend had not been reduced; but the Company were exhausting their reserves in order to pay it. Mr. Woodall was not prepared to say that if the Morley Gas-Works passed into the hands of the Corporation the consumers would get their gas any cheaper. He believed that the gas would be made by the Corporation at a lower rate; but he did not know that the consumers would pay less. In his opinion, one of the weaknesses of the system of gas supply by corporations was the tendency of municipal bodies to make a profit in order to keep down the rates. People seemed willing to pay an indirect tax in the form of a higher price for gas, so that they might reduce the direct taxation of the rates.

Evidence was then given by Mr. C. Gott, M.Inst.C.E., Consulting Engineer to the Corporation, who expressed the opinion that the purchase of gas-works by the Corporations of Bradford and Ilkley had proved highly advantageous. He was followed by Mr. Charles Hunt, M.Inst.C E., who said he knew of no precedent for the proposal of the Company to acquire the Churwell Gas-Works. He thought there were distinct advantages in having the gas supply in the hands of the Local Authority, in regard to the breaking up of the streets, the collection of accounts, and so on. He added that he had recently examined the Company's works, and thought extensions ought to be made immediately, though the works were substantially built and in good condition.

This closed the case for the Corporation.

Mr. Pember then addressed the Committee. He pointed out that, while there was a growing disposition on the part of Parliament to put water supplies into the hands of municipal bodies, there was no such disposition in reference to gas supplies. In fact, he said, he was unaware of any instance in which a gas company who were doing their duty fairly well had been purchased compulsorily in consequence of the decision of a Parliamentary Committee. With reference to the irregularities which had been alleged against the Gas Company, they were, Mr. Pember contended, hardly worth mentioning. The reserve fund did not exceed the 10 per cent. of the capital which the Company were authorized to use as a reserve. If the insurance fund was irregular, it could easily be applied to some legitimate purpose; while as regarded the alleged expenditure of £4681 on capital account in excess of the capital raised, the gas consumers might, he thought, congratulate themselves on having so large a sum spent on capital account and bearing no interest. Referring to the contention put forward on behalf of the Corporation—that as a result of the competition of the electric light the price of gas would be raised to poor consumers, Mr. Pember remarked that this was distinctly disproved by the evidence of Mr. Woodall respecting the effect of the introduction of the electric light into Southampton.

The first witness called for the Gas Company was Mr. Enoch Hardwick, the Chairman, who denied that he had ever heard any complaints respecting the character of the gas supplied, except on one occasion several years ago, when, owing to the mistake of a workman, the gas was turned into the holders before being passed through the purifiers. The illuminating power of the gas generally supplied by the Company was a little over 17, and sometimes up to 18 candles. The present price was 2s. 4d. per 1000 cubic feet; but the Company were discussing the question of reducing it to a still lower point, and would probably have done so already but for the present proceedings. Mr. Hardwick denied the accuracy of the account given by the Mayor of Morley as to the interview which took place between representatives of the Corporation and the Gas Company respectively on Dec. 15 last. He said that, as soon as he saw the Mayor and his colleagues, he told them that the Company were not prepared to sell, and asked what offer the Corporation were willing to make. No offer was forthcoming, and nothing else occurred. There was, he emphatically declared, never any consent on his part or on the part of his co-Directors to sell. Witness was pressed in cross-examination by Mr. Balfour Browne, to state at what price he would be willing to sell; but he declined to say more than that the Company were not sellers, and that he might possibly agree to sell if he could fix his own price. Mr. T. Barron, a Director of the Company, having given confirmatory evidence, Lord Rookwood remarked upon the direct conflict of evidence that had been disclosed between the two sets of witnesses, and said that if he were in a Court of Law he should take notice of it.

The last witness called before the rising of the Committee was Mr. R. Porter, Engineer and Secretary of the Elland Gas Company, who gave a detailed description of the Morley works. He spoke in high terms of the way in which they were constructed, and stated generally that they were in an excellent condition, and that, except in the matter of the scrubbing plant, the accommodation was largely in excess of present requirements. He had advised the Directors to increase the scrubbing plant next winter, at a cost of over £2000; and he had also recommended them to introduce the prepayment meter system into Morley, where he thought there was a large field for it.

On the re-assembling of the Committee on the following Monday, evidence on behalf of the Morley Gas Company was continued. Mr. H. J. Hemingway, the Secretary, stated that the Company's operations had increased largely in recent years, while the price charged for gas had gradually decreased. Between 1849 and 1860 the price was 5s. 10d. per 1000 cubic feet; but by 1880, it had been reduced to 3s. 9d. In 1880, it was lowered to 3s. 4d. per 1000 cubic feet; in 1881, to 3s.; in 1883, to 2s. 9d.; in 1885, to 2s. 6d.; in 1894, to 2s. 4d., which was the present price. He thought that the Company would be in a position to make a further reduction shortly. Last year the make of gas was 103 million cubic feet, of which 89 million cubic feet were sold. The Company had paid their maximum dividend since 1862. Witness had no knowledge of any formal complaint having ever been made respecting the quality of the gas supplied, except on the one occasion referred to by the Chairman, when unpurified gas was sent out owing to the mistake of a workman. But, of course, consumers made the usual complaints when they went to pay their quarterly bills. The Company's statutory standard of illuminating power was 16 candles; but during the last four years the actual power attained had been between 17 and 18 candles. There was in the town a testing-station which was open to the inspection and use of the Corporation; but since the year 1892 they had only used it twice. In reference to the repair of streets which had been opened, there was an arrangement by which the Company paid the Corporation 2s. per yard for making good the surface of thoroughfares paved with granite; but in the case of streets which were not paved, the Company did the work themselves. The Company had never sent written notice to the Corporation of their intention to open streets; but the Manager had instructions to let the Surveyor know when repairs of pipes were to be made. With regard to the Company's finances, Mr. Hemingway stated that the balance-sheets had been sent year by year to the Corporation; and no complaint, so far as he knew, had ever been received as to the way in which the balances were dealt with.

Mr. E. H. Stevenson, M.Inst.C.E., was the next witness. He said he had visited the Morley Gas-Works, and thought they had been exceptionally well managed. They were worked more cheaply than almost any other similar undertaking, and more cheaply by far than the average of the large works managed by corporations which were mentioned in "Field's Analysis." The works were well designed, substantially erected, and in very good order. Except in the case of the scrubbers, the accommodation was considerably in excess of present requirements. The purifiers were more than adequate. There were four of them; while in most works of the same size there were only three. Mr. Stevenson ridiculed the suggestion that unpurified gas had been supplied to the consumers, except on the one occasion of which evidence had been given. The smell would have been so bad that people would not have stood it; and the Corporation would, of course, have taken steps to put a stop to the nuisance. The working expenses were 11½d. per 1000 cubic feet, which was very low. Up to the present time, the Company had not pressed the sale of gas by the use of prepayment meters, the employment of which would, he thought, compensate them for any loss they might sustain owing to the competition of the electric light. Such competition had been found in all cases to induce gas consumers to burn more gas. With regard to finance, he admitted that the expenditure of money out of the reserve fund on repairs and renewals was not strictly legal; but he said it was only doing a thing in one step instead of two. According to the strict letter of the law, the Company should have taken the money out of the revenue of the year, and have made up the deficiency in the dividend out of the reserve fund. It really, however, came in the end to exactly the same thing. It was true that the Company had in hand a large floating balance; but more than a quarter of it had come from the income of the past year, and until the year was ended they did not know that they would have such a big balance. The Company now saw that they could afford to reduce the price of gas; and they were going to do so. Mr. Stevenson declared that, in his experience, there had been no case in which Parliament had taken away from a gas company who did their work properly the powers on

the faith of which the shareholders had invested their money. He denied that the competition of the electric light was likely to cause a rise in the price of gas to small consumers, and said that the experience of places where electric lighting had been introduced was that the price of gas continued to fall. In cross-examination by Mr. Balfour Browne, witness expressed concurrence with evidence he had given in a previous case, to the effect that in every instance in which gas undertakings had been transferred to local authorities, the public had benefited.

Mr. W. R. Chester, M.Inst.C.E., having given evidence as to the good condition of the works and the extraordinarily low cost at which gas was produced there,

Mr. Balfour Browne replied on behalf of the Corporation. He protested strongly against the system which, he said, seemed to be growing, of expert witnesses like Mr. Stevenson running about from committee-room to committee-room giving evidence upon oath as to the expediency of passing one Bill or rejecting another. The only object of the Morley Gas Company, he added, in promoting their Bill and opposing that of the Corporation, was to enhance the price which the Corporation would have to pay for their undertaking. They had evidently been told that if they sold willingly they would not get the 10 per cent. awarded under the Lands Clauses Act for compulsory purchase; and therefore they were resisting to the last. There were precedents for the passing of the Corporation Bill. In the Ilkley Bill, a demand for compulsory purchase by the Local Authority passed the Commons; and it was not till it had been fought to the bitter end in the Lords that the Gas Company, seeing no doubt that the case would be decided against them, agreed to sell. The Ystrad Bill and the decision in reference to the Reigate and Redhill Bill, by Lord Lauderdale's Committee, on the previous Friday, were also cases in point.

On the conclusion of Mr. Balfour Browne's address, it was announced that as Mr. Pembroke Stephens, who was to have spoken for the Churwell Company, was engaged in another room, the Churwell Company did not propose to intervene further.

After deliberating for a short time in private, the Committee passed the preamble of the Corporation Bill, on the understanding that clauses should be inserted giving the Company the benefit of the 10 per cent. for compulsory purchase provided for in the Lands Clauses Act, and also directing the payment by the Corporation of the cost of the reinvestment of the shareholders' money; it being of course understood that the Corporation would carry out their agreement to purchase the undertaking of the Churwell Company. On the suggestion of Mr. Baggallay, it was agreed that the Company's Bill should be kept alive for the present, in view of the possibility of the Company contesting that of the Corporation in the House of Commons.

On the following day the clauses were settled. An agreement had been arrived at by the parties as to the provisions to be inserted in the Bill; and these having been passed and the remaining clauses gone through, the Bill was sent to the Earl of Morley, the Chairman of Committees, in order that he might report it to the House. It was announced by the Morley Gas Company's Agent that their Bill had been withdrawn in consequence of the agreement made with the Corporation.

HOUSE OF COMMONS COMMITTEE.

(*Before Mr.* A. H. Brown, *Chairman, Sir* J. Woodhouse, *Mr.* Bathurst, *and Mr.* Brigg.)

The above-named Committee continued their sittings last Tuesday, taking up the consideration of the

THANET GAS BILL.

By this Bill the Thanet Gas Company, which was formed in 1824 for the supply of gas to the town of Margate, seek further capital for the purpose of acquiring, by agreement, 12 acres of land on which to construct additional works for the manufacture of gas, and a siding, adjoining the railway, to facilitate the delivery of coal. The existing authorized capital of the Company is £44,000, with power to borrow a further £11,000. All this capital has been expended, and the Company ask for authority to raise, under the auction clauses, an additional £100,000, with borrowing powers to the extent of one-fourth of this amount. They also propose to convert their 7 per cent. stock into 3½ per cent. The consumption of gas in the year 1880 was 62 million feet; and last year it was 188 millions. The consumers in 1897 numbered 2854 on the ordinary, and 833 on the prepayment meter system; and there were 1600 gas-stoves in use. The only petition against the Bill was that of the Corporation of Margate, whose principal objection was that the ground the Company were proposing to take for the erection of their new works was almost immediately over the Corporation's most important water supply.

The case for the Company was conducted by Mr. Balfour Browne, Q.C., and Mr. Boyle; for the Petitioners, by Mr. Freeman, Q.C., and Mr. Duke.

It was contended for the Company that the proposed extensions were absolutely necessary to meet the increasing demand for gas; that it was impossible for them to enlarge their present works, which were in the very centre of the town; and that the site which had been selected, and which they had the option of purchasing on very reasonable terms, was eminently suitable. The capital spent by the Company per million cubic feet of gas supplied had been £387; and the dividend represented only 6d. per 1000 cubic feet in the price of gas.

In support of the Company's case, a number of witnesses were called; the first being Mr. W. Curling, a Magistrate of the County, the Chairman of the Company, who gave evidence that they supplied gas within the area of the Corporation up to the Westgate boundary. The capital raised was £44,000 of 7 per cent. consolidated stock, subject to a standard dividend of 4s. 2d. with the sliding scale. They had expended the whole of their capital. The demand for gas had doubled in the last ten years. The gas-works as they now stood were not adequate for even the present supply; and it was absolutely necessary that they should be enlarged. The price of gas had been reduced from 4s. 2d. to 2s. 6d.; and the average dividends were about 9 per cent. They had great difficulty with regard to their coals, which could not be landed in the harbour, but had to go to Greenwich, where they were put into barges and sent on to Margate; the cost to the Company being about 14s. 8d. per ton delivered. They had an option as to the purchase of the electric lighting; but if the Corporation had the slightest objection to this, the Company were prepared to waive it.

Mr. Freeman here intimated that the Corporation had an objection; and the clause was thereupon formally withdrawn.

Witness, in further cross-examination, said that it was in his opinion a perfectly proper thing for the gas-works to be constructed in close proximity to the water adits of the Corporation.

Mr. W. Fuller, the Company's Secretary, said the meter rents had been reduced to half what they were eighteen years ago. They had had no complaints since 1891. The present charge to the Corporation for gas for the public lamps was 2s. 6d. per 1000 cubic feet, the same as to other consumers; and the gas was always of 14-candle power.

Mr. H. E. Jones, M.Inst.C.E., Consulting Engineer to the Company, said they had supplied gas at the lowest price of any town in Kent. With regard to coals, the great difficulty in Margate was the very heavy harbour dues of 2s. 3d. per ton. The sale of gas had gone up nearly 40 per cent. in the last four years; the cost of residuals had decreased to 3½d. per 1000 cubic feet; the mains had been extended by 6½ miles; there was a daily increase in gas-stoves; and the sale of gas last year was 175 million cubic feet. The total capital, with premiums, expended had been £76,000. The Company had overdrawn their banking account by £600; and it was absolutely necessary that they should have further capital. There were no facilities for increasing the present works; and therefore new ones on the proposed site were very desirable. He had made inspections of several sites in the neighbourhood, in order to find the most suitable one; and he considered the one proposed was the best from all points of view. They had originally wanted to have their works alongside the railway, over the water adits; but, in deference to the Corporation, they chose the present site. With regard to contamination through leakage, there was no danger of this. The soil was chalk, they would construct perfectly water-tight tanks, and they would not be likely to allow any of their products to escape, as they were too valuable. The Company were prepared to construct these absolutely water-tight tanks to the satisfaction of the Corporation; to submit plans of them; and to adopt any additions or alterations they might ask for. In cross-examination, witness said he would have no objection to raising the illuminating power of the gas to 15 candles; but it would increase the cost. If the Company contaminated the water adits in any way, they were under an immediate penalty of £200 for each offence. He would point out that the Colne Valley Water Company actually sunk two wells close to the gas-works at Watford, where the soil was also chalk.

Mr. E. H. Stevenson, M.Inst.C.E., was next called. He did not see how the present works could be extended. They were in the centre of the town; and it would be necessary to enclose roads to do it. The proposed site for the new works was by far the best that could be chosen. He did not think the water supply could possibly be damaged, as there was no difficulty in making perfectly tight tanks in a chalk soil.

Mr. W. A. Valon, J.P., did not think there would be the slightest risk of contamination if the gas-works were actually over the water adits, and even if there was leakage, the danger of pollution would be reduced to a minimum, owing to the thousands of tons of chalk through which it would have to percolate. He considered the proposed site a most suitable one in every respect.

Mr. H. H. Jones, late Engineer of the Company, gave evidence as to the works immediately necessary—viz., new boilers, engine-house, stokers' lobby, workmen's recreation-room, station meter and house, and governor. All these ought to be attended to at once.

Mr. W. B. Bryan, M.Inst.C.E., Engineer of the East London Water Company, said that his Company had a large number of reservoirs which were absolutely tight, and he could not see the slightest difficulty in making gas-tanks tight. There would be no risk to the water supply of Margate by reason of the proximity of the gas-works, if the tanks were properly made. In the ordinary way, manure stored on land would be much more dangerous close to a water supply than a properly constructed and well managed gas-works. A good protective clause in the Bill would overcome any reasonable objections to danger from pollution.

Mr. O. F. Daniels, Solicitor in Ramsgate to Mr. Julian de Bain, who granted to the Margate Corporation the right in 1887 to put in the water adit, was the last witness called on behalf of the Company. He said that the Corporation had covenanted with Mr. De Bain to the effect that they should "so construct their works as in no way to prejudice or impair the suitability of the said pieces of land and the adjoining premises for agricultural, building, or other purposes." In cross-examination, witness said he thought it was a little unusual for a covenant to provide for adjoining owners.

In support of the Corporation case, Mr. Freeman urged that the first duty they had to perform was to see that their sewerage was good and their water pure. This was especially so in the case of a health resort like Margate. The Corporation had spent £16,000 in driving their adits along the valley; and in view of the serious risk of contamination of their water supply by these new works—the mere suggestion of which, were it to become known, would cause an epidemic, and have the effect of keeping visitors away from the town altogether, as had happened in other cases—the Corporation could not abstain from appearing against the Bill, in the interests of the ratepayers. It was impossible for anyone to say that the works would be water-tight. The Company had selected the very worst site, within a few feet of their adits; and it might be a matter of great injury to the town if it was thought that there was a danger of pollution. If there was any leakage at all from the gas-works, it would be bound to percolate down to the water. There was a possibility of risk; and a penalty of £200 would be utterly useless in the event of contamination, and a consequent epidemic. They would have to bring an action in the High Court, months might elapse before the trial was reached, and the costs of recovering would exceed the penalty itself.

The first witness called in support of the case for the petitioners was Mr. Baldwin Latham, M.Inst.C.E., who gave a number of instances of sewage percolation polluting water supplies, and said that he considered the proposed site a most improper place for the erection of gas-works. He had known many cases of reservoirs leaking. There was no security that the gas-tanks would ever be absolutely tight; and there were many ways in which leakage might occur in a gas-works and never be detected. In addition to this there was always the practical risk of contamination in the fact that a subsidence might at any time take place in the chalk, and thus cause cracks in the works.

In cross-examination, witness said he did not agree with the opinion expressed, that manure stored on land was more dangerous than a gas-works. Manure percolated according to the amount of rain; and rain, he had found, by the most careful examination and experiments, only percolated about a yard a year. It might take twenty years for manure to get down to the water-line; and by that time its obnoxious constituents would be perfectly oxidized. A penalty of £200 for pollution would, he thought, be no protection to the Corporation; and the consequences of such an event happening and becoming known would be very serious and far-reaching.

Mr. Albert Latham, M.Inst.C.E., Engineer and Surveyor to the Corporation of Margate, did not consider it a safe thing to put gas-works on the proposed site, which was only about 70 feet away from the Corporation adits. He said that the water supply of Margate had been proved by analyses to be excellent; the maximum pumping per day being 1,100,000 gallons—400,000 gallons from the Dane Valley, and 700,000 gallons from the Tivoli.

Mr. Wootton, J.P., Chairman of the Water-Works and Sanitary Committees, said that it was of the very greatest importance that there should be no sort of suspicion that the water might be contaminated. The Corporation had no wish to assume a hostile spirit to the Company; but they considered the site very unsuitable. He was certain that if the Company went half-a-mile further on, they could get a suitable site which would not interfere with the Corporation adits.

Mr. Corbet Woodall, M.Inst.C.E., said he had visited the proposed site and also the existing works of the Company. In his opinion, the site was not a good one; and he thought that the Company should go on extending their present works. He considered that the existing works were quite capable of meeting the demands for several years to come. They were not by any means working up to their full capacity, and could be extended so as to more than double the present output. It was time that the Company began to look out for additional storage room. He thought the proposal in the Bill to consolidate the share capital an excellent one; and in the event of it passing, £125,000 would not be an excessive amount of additional capital. He had known instances of leakage from tanks and percolation; but the greatest danger of contamination arose from the carelessness of workpeople in spilling tarry and other matter on the surface, and leakage of gas from connecting-pipes underneath the ground, which made the soil sour, and so caused pollution from rain percolation.

In the result, the Committee passed the preamble, conditionally on certain small alterations in the Bill and the insertion of the following protective clause:—

The Engineer of the Corporation of Margate, hereinafter called the Borough Engineer, may during the construction of the works by this Act authorized to be constructed on the lands described in the Schedule to this Act, inspect the same for the purpose of seeing that they are constructed water-tight; and if in the opinion of the Corporation Engineer any alteration or strengthening of any of the works aforesaid be necessary for the prevention of the contamination of the water supply on or under the land adjoining the lands aforesaid, he shall forthwith signify his opinion in writing to the Company, giving full details of the work which he considers necessary, and the Company shall execute the said works in accordance with such requirements. Provided that in the event of any difference between the Engineer of the Company and the Corporation Engineer as to the reasonableness of any such requirement, the same shall be settled by an arbitrator to be appointed by the President of the Institution of Civil Engineers.

It was further agreed that before the works were commenced, the plans for the construction of same should be submitted for the approval of the Corporation; and that the power of entry and inspection of the Borough Engineer should be limited to twelve months.

Sir J. Kitson's Committee disposed last week of the only opposed Bill remaining in Group A—the Hartlepool Gas and Water Bill. This Bill was chiefly for power to construct new reservoirs; and it was opposed generally by the Corporation of West Hartlepool. The Company asked for additional capital to the amount of £150,000, with borrowing powers to the extent of £37,500. In the result, the Committee passed the preamble of the Bill, but gave the Company only £80,000, and authorized the borrowing of £20,000. The illuminating power of the gas is to be raised to 15 candles. Clauses are to be considered to-day (Tuesday).

The Committee presided over by Mr. A. H. Brown resumed on Tuesday the consideration of the Bills in Group B. We give above a report of the proceedings on the Thanet Gas Bill. The Frodingham Gas Bill was to sanction the formation of a Company for the erection of works and the supply of gas in Scunthorpe, Brumby, and Frodingham, in Lincolnshire, and the acquisition of the gas-works of the Frodingham Iron and Steel Company. The opponents were the District Councils of the above-named places, who said that the Company's works were ill-adapted for the supply of gas, and that the Councils were desirous of having the supply in their own hands. In the course of the inquiry, the Committee expressed the opinion that the matters in dispute might be compromised; and eventually the Bill was withdrawn, on the understanding that the promoters' costs to the extent of £500 are to be paid by the Councils, and that the Scunthorpe Council are to apply to Parliament next session for statutory powers for the supply of gas. The only remaining opposed Bill in the group—the Cromer Gas Bill—has been practically settled; and it was postponed till to-morrow.

Sales of Shares.—Last Wednesday, a few 8 per cent. £10 shares in the Worksop Gas Company were sold in the town for £19 10s. each. Eight original £30 shares in the Yarmouth Gas Company, bearing interest at the rate of 8¾ per cent., have lately been disposed of by public auction for £61 10s. per share. Two similar shares realized £62 10s. apiece.

Reductions in Price.—The Lennoxtown, Dumbartonshire, Gas Company have reduced the price of gas from 4s. 7d. to 4s. 2d. per 1000 cubic feet. The reduction made by the St. Mary Church District Council in the price of gas to 3s. 6d. per 1000 cubic feet, as notified last week, applies only to the public and private lighting; the charge for gas used for cooking, heating, and motive power remaining the same as it has been for the past ten years—viz., 3s. per 1000 cubic feet.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Friday, March 25.

(*Before Mr. Justice* NORTH.)

Attorney-General at the Relation of the Swansea Gas and Coke Company v. Mayor, &c., of Swansea.

The hearing of this motion, seeking to restrain the defendants from expending the borough rates in opposing the plaintiffs' Bill in Parliament see *ante*, p. 655), was resumed this morning.

Mr. SWINFEN EADY, Q.C., Mr. MACMORRAN, Q.C., and Mr. KNOWLES CURRIE appeared for the plaintiffs; Mr. VERNON SMITH, Q.C., and Mr. R. J. PARKER represented the defendants.

Mr. SWINFEN EADY informed his Lordship that the Bill came before a Committee of the House of Lords on Monday, and some discussion took place as to its standing over until the present motion had been disposed of. Ultimately, however, the defendants were allowed to appear in their individual capacity, and oppose the Bill. Certain provisions were withdrawn or modified; and, in the result, the opposition was confined to four points, on all of which the opinion of the Committee was adverse to the Corporation. These points were: (1) An objection to the additional capital; (2) the place of testing the gas; (3) a claim for an independent audit of the Company's accounts; (4) the insertion of a clause preserving all rights which the defendants now possess. All these points were decided against the defendants, and the Bill was allowed to proceed; but it was still necessary for the motion to be disposed of, as it sought to prevent any of the expenses incurred in the opposition being defrayed out of the borough rates.

Mr. MACMORRAN read at considerable length from the proceedings before the House of Lords Committee. He then submitted that there was nothing in the Bill which authorized the defendants to oppose it, paying the expenses out of the rates. Their *locus standi* to appear was not disputed. The sole question was as to their right to charge the expenses on the rates; and in this question the relators, being large ratepayers, were vitally interested. He read several passages from the Brecon case, on which the defendants relied, and pointed out that the circumstances there were totally different from those in the present case; the rights of the Corporation of Brecon with regard to the regulations of market and slaughter-houses being directly attacked by the Company whose Bill they opposed. He submitted that this case came within the principle laid down in the Sheffield case, and that the injunction ought therefore to be granted.

Mr. VERNON SMITH submitted his argument on behalf of the defendants. He admitted that they had not brought themselves within the provisions of the Borough Funds Act, and therefore the case must be treated as though the Act did not exist; but he contended at some length that, apart from the powers of the Act altogether, the Corporation had a right to oppose the Bill under the general law, as a means of defending themselves against an attack made on their property or rights. When pressed by his Lordship to define the rights which were attacked or affected, he at last rested his case almost, if not entirely, on the contention that the Corporation had a right to obtain gas from the Company at a certain price, and that as, under the Bill, the price of gas might be altered, the rights of the Corporation were affected, and therefore they were entitled to defend them.

Mr. PARKER followed, and practically confined his argument to the last point; disclaiming any right on the part of defendants to be acting in a representative capacity, but contending that the case was governed by the Brecon, and not by the Sheffield case, and that the Corporation were merely defending their own rights as consumers of gas.

Justice NORTH (addressing Mr. Swinfen Eady) said the only question seemed to be whether the fact that the Act might affect the price which the Corporation, in common with other persons, would have to pay for gas gave them a right to oppose it out of the borough funds.

Mr. SWINFEN EADY said he submitted that it did not. He then proceeded to point out the distinctions between the present case and that of the Corporation of Brecon.

Justice NORTH intimated that he did not desire to hear any further argument, and proceeded to deliver the following judgment: In this case the relators, who have put the Attorney-General in motion, are the Swansea Gas Company; and defendants are the Corporation. The Company brought a Bill into Parliament for the purpose of making certain alterations in the law; and the Corporation presented a petition against the Bill, raising ten or a dozen grounds of objection to it. A good many of these have been disposed of. They have all been dealt with, in fact, because since the matter was before me last week it has been before a Parliamentary Committee, and all these various points have been disposed of—mostly against the Corporation. I do not think the decision of the Committee is conclusive against the Corporation in every sense, because, taking one clause as an instance, the Corporation desired to have a saving clause inserted. The promoters objected to it because they said there was nothing to save, as the Bill as it stood did not interfere with the powers or privileges of the Corporation. The Committee heard the arguments, and decided against the insertion of any such clause, because they considered there was nothing to call for it, or that, on the merits of the matter, it was better left out. But though it would have been open to Counsel to raise the point before me, that the opposition was well founded, although the Committee had decided against the clause—although I agree that such argument, if there had been any foundation for it, might very properly have been introduced here—no such point has been made on any of these various matters except one. The one objection made now is this—that the Corporation had a right to oppose because there was a proviso in the Bill that interfered with, or might interfere with, the sum they would have to pay in respect of the supply of gas by the plaintiff Company (the relators) to them and to the other inhabitants of the town. The rights of a Corporation to oppose a Bill in Parliament out of the borough funds under the Municipal Corporations Act was the subject of considerable discussion in the case of *Regina v. Mayor, &c., of Sheffield*, which has been referred to. In that case, the learned Judges of the Court of Queen's Bench came to the conclusion that certain steps which were taken by

the Corporation, however meritorious and proper in themselves, were not of such a character that the Corporation were justified in paying the expenses of the proceedings out of the borough fund; and the following year, no doubt in consequence of the decision, an enabling Act was passed—the Borough Funds Act of 1872. By the second section, it was provided, reading it shortly, that when, in the judgment of the governing body of a district, it is expedient for that body to promote or oppose any local or personal Bill in Parliament, or to promote or oppose legal proceedings for the promotion or protection of the interests of the inhabitants of the district, it shall be lawful for the governing body to apply the borough funds, borough rates, or other public funds or property, to the payment of the costs and expenses attending the same. Then it goes on to say: "Provided that no powers contained in this Act shall apply in any case where the promotion of or opposition to a Bill by a governing body has been decided by a Committee of either House of Parliament to be unreasonable or vexatious." Then section 4 lays down certain preliminaries that have to be observed in making such opposition. No expense in relation to the promoting or opposing any Bill should be charged as aforesaid, unless incurred in pursuance of a resolution of an absolute majority of the whole number of the governing body, at a meeting summoned in the way pointed out in the Act, or unless the resolution had been published twice in certain newspapers, and had received the sanction of the Local Government Board. It provides, further, that no expense in promoting or opposing any Bill should be charged as aforesaid until the promotion or opposition has had the consent of the owners and ratepayers of the district, to be expressed by resolution in the manner provided by the Local Government Act of 1858. Now the necessary preliminaries or formalities provided for by the section have not been complied with in any way. If they had been, no doubt the Corporation might have stood in a very different position in opposing the Bill in Parliament. But none of them have been had recourse to; and the Corporation do not get any assistance from the Act. Then there is at the end section 8, which says that nothing in the Act shall take away or diminish any rights or powers now possessed or enjoyed by any governing body, or which are or should be vested in or exercisable by the inhabitants of any district under any General or Special Act—that is to say, it was preserving existing rights as they were, and in the sections I read giving increased facilities which might have been, but had not been, taken advantage of. Nothing therefore turns on the Act itself. There is a saving clause preserving any rights the Corporation have in fact; but it does not give them any right. Now, when we come to consider the various grounds which were put forward as justifying the opposition by the Corporation to the Bill, the only one that has been urged before me is this: That the effect of the Bill was to alter, certainly or possibly, the amount that the Corporation might have to pay in respect of their gas. Is that a matter with respect to which the words of the saving clause I have just read have any application? I do not think they have. I think that the case of *Regina v. Mayor, &c., of Sheffield*, which has been extensively commented upon, and which I will not go into fully again, is a very strong authority in favour of any such proposition. It is a case which led to a change in the law; but a change which, as I said, has not been utilized on this occasion. But I wish to refer more particularly to the decision of the late Master of the Rolls in *Attorney-General v. The Mayor, &c., of Brecon*. I should say, before doing so, that the question of payment is merely this: According to the law as it now stands, the Corporation have to pay for all gas supplied to them for the lighting of the streets and their own buildings, and so on; and a scale of payment is fixed by section 24 of the Gas-Works Clauses Act of 1871—I should not say fixed, but the means of fixing it are provided by the clause. It provides that the undertakers shall supply gas to any public lamps at such times as they are required to do so, and so on; and the price to be charged by the undertakers, and to be paid to them for all gas supplied, shall be settled by agreement between the local authorities and the undertakers, and in case of difference by arbitration—regard being had to the circumstances of the case, and the price charged to private consumers in the district. Now it was proposed in the Bill as introduced, that there should be an alteration in the mode of charging for gas. It was proposed to insert what was called a sliding-scale, by which, instead of there being a fixed maximum amount payable by way of dividend, it might be increased to a certain ratio having regard to a diminution in the price to be charged to customers. This did not affect the Corporation at all under the section I have just referred to, except, of course, that in any arbitration to fix the amount to be paid, the price which private customers were charged was to be taken into consideration. Then is the right of the Corporation to have the gas at the old rate, one which is interfered with or taken away by the Act? I think it clearly is not. The right to have the price fixed by arbitration is not touched in any way. It is a question existing between the Gas Company on the one hand and the Corporation on the other; but, in my opinion, it is not a right which has operation given to it by either the old law existing prior to the passing of the 1872 Act, or saved by the operation of section 8 of the Act. This matter was gone into very fully before the Master of the Rolls, as I said, in *Attorney-General v. The Mayor, &c., of Brecon*. In that case, what was done was to interfere with the rights of the Corporation in respect of the market-house, the market-place, the regulation of the tolls, the existence and situation of slaughter-houses, and so on; and I do not think the subject-matter of the motion makes it worth while to dwell upon it further than to indicate what the matter was with respect to which the Master of the Rolls laid down certain rules. The view he took was that, independently of the provisions of section 92 of the Municipal Corporations Act, a corporation that was attacked had a right to defend itself. He went into various points dealing with their position, and saying in what way such right of defence existed. First of all he refers to the possibility of some attempt being made actually to destroy the Corporation itself. He pointed out that this was a thing they would be perfectly justified in resisting. Then there was another way in which it might have been attacked. There might be an attempt to revoke its Charter. That again he points out, as a matter of course, they must have a right to resist. [His Lordship read several passages from the judgment of Sir George Jessel in the Brecon case.] Now, do the powers of the Corporation, taking them as fully as they are set out and defined in this case, include the power to oppose a Bill because it contemplates an alteration in the rate to be charged for gas; the existing law, which is not proposed even to be interfered with by the Bill, being that the price to be paid by the Corporation is a subject-matter for arbitration? It seems to me that it would be ridiculous to say that a Bill proposing to alter the scale, but leaving the right to settlement by arbitration untouched, would be an attack on a substantial portion of the privileges, rights, or duties of the Corporation of Swansea. Under these circumstances, I am of opinion that the expenditure of the borough fund in opposition to the Bill is not justified.

His Lordship therefore granted the injunction asked by the motion; restraining the application of the borough funds to the cost or expense of opposing the Bill until such consents are obtained as are provided for by the Borough Funds Act. This would, he remarked, cover any opposition in the House of Commons. He added that if the parties liked to treat the motion as the trial they might do so, in which case he should direct the Corporation to pay the costs.

Fire Insurance and the Storage of Acetylene Gas.

At the Birmingham Assizes last week, Mr. Justice Kennedy had before him a case bearing upon the question of the insurance of buildings in which acetylene gas is employed. The plaintiff was Mr. Edward S. Bond, a cycle-lamp maker; and he claimed damages from the Midland Cycle and Motor Car Exhibition Company for breach of contract. It appeared that Mr. Bond held a stall at the last cycle exhibition at Bingley Hall, for the purpose of showing an acetylene lamp. On the third day of the show, he was prevented storing the gas and exhibiting the lamp in action, on the ground that the storage of calcium carbide was a danger to the exhibition. One of the witnesses was Mr. Hugh Lewis, the Manager in Birmingham of the Northern Insurance Company. He stated that his Company agreed to grant a policy of insurance on Bingley Hall; but at the time he was not aware that acetylene gas was going to be stored there. On learning this, he wrote stating that the gas was regarded as dangerous. Mr. C. Wheelwright, Secretary to the defendant Company, gave evidence to the effect that the management had not the slightest objection to the exhibition of the lamps—in fact, they considered plaintiff's stall was a special attraction. It was only in consequence of the objections made by the authorities that they ordered the removal of the gas. When he let the stall, he had not the least idea that a large acetylene gas generator was going to be used. It was arranged that the question to be left to the jury was whether the exhibit was or was not a danger—all other points resting with his Lordship. The jury found that the acetylene gas was not dangerous under the circumstances in which it was exhibited; and his Lordship assessed the damages at £15.

The Hampton District Council and the Rating of Reservoirs.—The Hampton District Council last Tuesday had under consideration the recent decision of Justices Wright and Darling in reference to the rating of the Southwark and Vauxhall Water Company's reservoirs. The proceedings, which were reported last week (p. 656) resulted in the success of the Company, whose appeal, it should have been stated, was allowed, with costs. At the outset, the Clerk (Mr. F. A. Kent) said it was his opinion the Council would succeed in a Superior Court; and he certainly advised them to appeal. It was a question of great moment, not only to Hampton, but to all the surrounding parishes. In reply to a question it was stated that, if the Council lost the case, they would lose at least £300 a year on one reservoir alone. The Clerk further mentioned that Sir Edward Clarke had expressed his satisfaction with the judgment; it being virtually in the Council's favour. Mr. Ross moved that the appeal be prosecuted; and Captain Christie seconded. Mr. Larcombe pointed out if they lost the case it would mean an expenditure of £1000; and he therefore thought it was a matter on which they should first consult the ratepayers, and take them into their confidence. He moved, as an amendment, that a public meeting of ratepayers should be called to consider the advisability, or otherwise, of appealing. This having been seconded, Mr. Keyes said that there was no question as to the feeling of Hampton in the matter; they were sick and tired of being ridden over rough-shod by the Water Companies. The Chairman (Mr. G. Sanders) agreed that the Council had gained a moral victory; and they ought not to throw it away. The amendment was rejected; and the original motion was then carried.

Sheppy Gas Company.—The annual meeting of this Company was held on the 16th inst.—Mr. C. B. Shrubsole in the chair. The Secretary (Mr. A. W. Marks) read the Directors' report, in which the declaration of full dividends on all shares was recommended. The Chairman, in moving its adoption, said there had been a considerable increase in the consumption of gas in the first three quarters of the past year; but in the fourth quarter, in consequence of the flood on the 29th of November, which seriously affected the works and mains, there was a great falling off—the total increase for the year being very small. The Directors were taking steps to guard against another such inundation by heightening the river wall abutting on their property. Penny-in-the-slot meters were now fixed when orders were received; and by means of these meters 150 persons had had gas laid on who probably would not otherwise have done so. The Company fixed the meter, two burners, and a boiling-stove with no expense to the consumer beyond the pennies placed in the slot for the gas they burned. The loss occasioned by the flood was covered by the profit carried over from 1896; and there was every reason to hope for a continuance of the prosperity which the Company had enjoyed for many years. Mr. Burch seconded the motion, and it was carried unanimously. Dividends were then declared of 4s. per share on the "A" shares, 10s. per share on the "B" shares, and 7s. per share on the "C" shares. The Directors, Secretary, Engineer, and staff were cordially thanked for their services during the year; special allusion being made to their exertions at the time of the flood. Mr. Marks, in reply, said it was an anxious time for all associated with the Company, as several streets or sections of streets were in darkness for the greater part of a week; and up to the present time they were still experiencing the effects of the flood. He was more fortunate than his friend Mr. Carpenter (the Manager), inasmuch as he did not have to swim for his life. Mr. Carpenter said not only were the fires put out by the flood, but the water got into the foundations, and altogether the Company had sustained a greater loss than they anticipated. He should go on improving the works, and looked confidently to a continuance of the prosperity of the Company.

MISCELLANEOUS NEWS.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

Half-Yearly Report and Accounts.

In the report to be presented by the Directors of the above-named Company at the half-yearly general meeting next Thursday, they state that the total income for the six months ending Dec. 31 last was £137,601. The accounts accompanying the report show that this was made up as follows: Gas sold to private consumers (601,233,800 cubic feet, at 3s. 5d. to 4s. 6d. per 1000 cubic feet), £107,012; public lighting, £7493; rental of meters, £3221; residual products, £19,730; rents and transfer fees, £145. The expenditure amounted to £101,127, of which £76,289 was spent on the manufacture of gas (£53,566 being for coal, cannel, and oil), £9438 for its distribution, and £4865 on management. The balance carried to the profit and loss account is £36,474, of which £31,065 is available for distribution. The Directors recommend the payment of the usual dividends at the rates of 10½ and 7½ per cent. per annum; but in order to do this, it will be necessary to draw £2502 from the reserve fund, which stands at £46,016; leaving a balance of £43,514 to the credit of the fund. The complaint which ran through our recent notices of the affairs of the Provincial Gas Companies as to the depressed condition of the residuals market is repeated by the Directors of the Dublin Company. They record, however, a slight improvement in the returns for sulphate of ammonia, though the depression in the prices realized for coke and tar continues. Never in the memory of the Board have the last-named products sunk so low in value. Compared with the corresponding period of 1896, there has been a diminution of £4478 in these items. Had this not been the case, no necessity would, of course, exist for drawing upon the reserve fund. During the past half year, the quantity of coal and cannel carbonized (exclusive of oil spirit) was 71,534 tons, from which 725,471,000 cubic feet of gas were made, and 655,878,000 cubic feet are accounted for. The residuals produced were: Coke, 87,477 chaldrons; breeze, 7319 chaldrons; tar, 688,769 gallons; ammoniacal liquor, 1,317,360 gallons.

BRITISH GASLIGHT COMPANY, LIMITED.

The Half-Yearly Meeting of this Company was held last Wednesday, at the London Offices, No. 11, George Yard, Lombard Street, E.C.—Mr. J. Horsley Palmer in the chair.

The Secretary (Mr. H. B. Chamberlain) read the notice convening the meeting, and also the report of the Directors. The latter stated that the balance of profit was £21,911, after deducting the items mentioned below, and adding £1895 from the Hull reserve fund, and £290 from the Trowbridge reserve fund; the parliamentary interest at these stations not having been realized by the amounts named. The deductions were: Income-tax, £857; Potteries excess profit, £296; Norwich debenture interest, £859; and Potteries do., £386. The gas-rental at the Hull station showed an increase of £1252, as compared with that of the corresponding period of 1896. Coke and tar exhibited a decrease of £1113; and tar distilling and ammoniacal liquor, £560. But sales of sulphate of ammonia increased by £114. Coal cost 10s. 2d. per ton, as against 10s. Coke realized 7s. 11d. per ton, compared with 8s. 4d. The gas sent out was 429,981,649 cubic feet, as against 417,362,468 feet, or an increase of 12,619,181 cubic feet. No. 4 retort-house had been fitted with regenerative furnaces and Arrol-Foulis drawing and charging machinery, and it had been in full work during the past winter. In the coming season, it would be necessary to reconstruct No. 1 retort-house. The profit realized was £1895 less than the parliamentary interest allowed; and this sum would be taken from the reserve fund—leaving a balance of £33,117. Regarding the Norwich station, the gas-rental showed a diminution of £1908. The amount realized for coke, tar, and ammoniacal liquor exhibited a decrease of £1900—the quantities made being only about one-half of those produced in the December half of 1896. Coal cost 15s. 6d. per ton, as compared with 14s. 1d. Coke had produced 7s. per chaldron, against 5s. 9d. The amount of gas sent out was 153,192,300 cubic feet, as compared with 164,088,000 feet, or a decrease of 10,895,700 feet. The profit realized was £2495 less than the parliamentary interest. Notice had been given of a reduction in the price of gas in Norwich from 3s. 6d. to 3s. per 1000 cubic feet from Jan. 1 last, at the same time abolishing the discounts. As to the Potteries station, the gas-rental showed an increase of £423; coke and tar, £159; and ammoniacal liquor and sulphate of ammonia, £127. Coal cost 8s. 4d. per ton, as against 8s.; while coke had realized 4s. 6d. per ton, as compared with 5s. 3d. The gas sent out was 163,617,000 cubic feet, as against 158,643,000 feet—showing an increase of 4,974,000 feet. The profit realized was £296 in excess of the parliamentary interest; and this sum had been invested in Consols—making the reserve fund at this station £15,562. At the Trowbridge station, there were small increases in the gas-rental and in the receipts for the residual products. Coal cost 13s. 7d. per ton, as against 13s. 1d.; while coke realized 6s. 6d. per chaldron, as compared with 6s. 7d. The gas sent out was 24,522,100 feet, against 24,799,805 feet. The profit was £290 less than the parliamentary interest; and this sum had been taken from the reserve fund; leaving a balance of £2979. Having referred to the results at Holywell, the report, dealing with the general accounts, stated that the profit, added to the previous balance at the credit of the profit and loss account was £47,283. From this the Directors recommended a dividend at the rate of 10 per cent. per annum, with a bonus of 2s. 6d. per share, both clear of income-tax. The dividend and bonus would amount to £23,625; and leave a balance of £23,658.

The Chairman, in moving the adoption of the report and accounts, said he did not rise with the pleasurable feelings he had often had on previous occasions, because the accounts did not show so much profit as in former half years. Of course, they had been affected by the same circumstances that had affected nearly all other gas companies. They had had, in the provinces especially, a great deal of sunshine and warm weather; and, in Hull particularly, this had had a marked influence on the consumption of gas and the amount of coke sold. Therefore as the report showed, they had not made the usual profit. Referring first to the Norwich station, he said that during last autumn their Manager at that station (Mr. F. E. Linging) was taken very unwell. He had, he (the Chairman) thought been overworking himself. He had worked himself into a great state of anxiety with regard to the station and various matters connected with it. Although he had been with the Company a long time, was thoroughly conversant with their affairs, and was still, comparatively speaking, a young man, Mr. Linging felt he ought to place his resignation in the hands of the Board; and it was accepted. The Directors felt it a duty to the shareholders as well as to Mr. Linging, that they should relieve him of the responsibility of the place. Norwich was a difficult station to work; and it had told upon him. Mr. Young, the Engineer of the Potteries works, was offered the appointment. He had been very successful at the Potteries; and, by his energy and devotion to business, he had materially improved the working at that station from the time he took it over, as was shown by the reduction in the price of gas from 3s. to 2s. 3d. per 1000 cubic feet. The Board felt there was considerable scope for improvement at Norwich; and they thought Mr. Young was the man who would try—and not only try, but be able to meet the situation there in a capable manner. They had therefore appointed him. He had not had time to show what he could do in the place; but he had expressed to him (the Chairman) his great hope that in the course of two or three years, a very different state of affairs would be shown at that station. They had had difficulties at Norwich with their carburetted water gas. When the Company were in Parliament on the last occasion, the town asked for gas of higher illuminating power; and the Board were strongly advised by Mr. Corbet Woodall to put down carburetted water gas plant to meet the request. This they did; but they had had difficulties with regard to the smell caused by the gas. The works at Norwich were situated in the very centre of one of the very best residential parts of the city—close to the Cathedral, the Dean's house, and various other important houses and works, and people had complained of the smell. The Directors were doing all they could to get over the trouble; and they had no doubt they would be successful. The profits had greatly fallen off at Norwich for some time; and after very careful consideration of the whole matter, they had come to the decision to make a very drastic alteration in the price of gas. They had hitherto had a large system of discounts there; but he did not think that had worked advantageously for the Company's business, because no one gave them credit for the discount. People only looked at the initial price. They said the price was very dear, and took no notice of the discount. After consultation with people on the spot, the Directors had decided to decrease the price of gas from 3s. 6d. to 3s. from Jan. 1, and do away entirely with the heavy discount which was allowed to the large consumers. They had had no difficulties at present with the latter. The largest consumers were the Railway Company and Messrs. Colman, who had both been interviewed by the Manager, and had accepted the situation in an amicable manner. The Board hoped the reduction would have a good effect, and that they would see the Norwich station going ahead instead of backwards. With regard to Hull, there had been an increase in the consumption of gas; but not at the rate at which they generally advanced at this station. A very important matter had now come to a head—that was, the supply of gas to the Kingston-upon-Hull district. As he mentioned at the previous meeting, the gas undertaking serving the district had been taken over by the Hull Corporation, who wished to abolish the works, which existed in a densely populated quarter. The Directors had tendered for the supply of gas in bulk at 1s. 6d. per 1000 cubic feet; and this had been accepted by the Hull Corporation in principle, subject to some small modifications in the agreement. The Directors estimated that this business would not at present necessitate any considerable expenditure on plant, beyond the laying of a large main something like half-a-mile to the town, where the Corporation would take the gas through their own meter, which they would fix at their own expense. The amount of gas which would be required for the district was calculated at about 100 million cubic feet. With the exception of this item, there was nothing to report regarding Hull. The business there was progressing slowly but steadily, though, of course, they had had difficulty in selling their residuals, especially tar. They had now 3784 prepayment meters fixed in their area, of which 649 had been connected during the half year. At the Potteries station, they had gone on almost as well as they had in previous half years; and they had been able to add £296 to the reserve fund. But he was afraid that the decrease of 1d. per 1000 cubic feet which he had hoped to be able to announce would have to be postponed, because they foresaw that the contracts for coal during the coming year would be at least 6d. per ton higher than last year, and they did not anticipate any improvement in the price of coke, of which they had a large stock at that station. Consequent on the removal of Mr. Young to Norwich, they had appointed Mr. J. R. Heath, who had been an assistant at the Potteries works for about twelve years, and who had a thorough knowledge of the district, to be the Manager of the station; and, as his assistant, they had selected Mr. Warrilow, who was also well acquainted with the district. The prepayment meter business was still going on steadily there. They had nearly 2000 meters fixed, of which 235 were new during the half year. There was not much to say with reference to Trowbridge. There had been an application for a supply of gas to the outlying hamlet of Staverton; and they proposed making a small outlay on an extension to the district. At Holywell, everything was going on the same. The London and North-Western Railway Company had given them a little trouble in connection with a Bill they had in Parliament; but this would soon be smoothed over. Quite recently the Board had lost the valuable services of their colleague Mr. Henry Wilkin, who had been with them 37 years, and who felt that his health was not good enough to continue as a Director. To take his place, they had elected a gentleman who was so well known to the shareholders that it was unnecessary for him (the Chairman) to launch out into any remarks as to his merits. He referred, of course, to Mr. Frederic Lane Linging. They were sorry to lose him from another position a short time ago; but they were doubly glad to welcome him back again on the Directors' side of the table. It was a great thing to have the services of a man on the Board who had such a thorough knowledge of the Company for such a great number of years, and who was so well acquainted with all matters relating to gas. There was one other little matter to which he wished to call attention. The Directors were recommending the usual £1 per share dividend and a bonus of 2s. 6d. It had been distinctly stated from the

chair several times that the bonus was a bonus, and was not to be considered as an integral part of the dividend. He was speaking very plainly on this subject, because he felt that the time might come, and at no very distant date, when the bonus would probably have to be discontinued—he did not say for always, but for perhaps two or three occasions, until at any rate matters became a little better in connection with residuals. He was not in favour of jumping up the price of gas to maintain a high dividend. It was bad for the shareholders, because it reacted upon them in this way—it created great discontent at the stations, and threw consumers into the arms of their competitors.

Major-General W. T. Corbie seconded the motion, which was unanimously carried.

The dividend recommended having been declared,

Mr. G. A. Burney moved, and Mr. R. S. Gardiner seconded, a vote of thanks to the Chairman and Directors, after which the services of the officers were acknowledged, on the proposition of Mr. F. L. Linging.

GERMAN CONTINENTAL GAS COMPANY.

Report and Accounts for 1897.

We have received, as in former years, a copy of the annual report and balance-sheet submitted on the 19th inst. to the general meeting of the above Company, of which Herr W. von Oechelhaeuser is the General Manager. From it we extract the following particulars:—

The phenomenal increase of 6·8 per cent. in the production of gas in 1896 was followed last year by an increase of 6·66 per cent.; while the profit earned by the undertaking in 1897 showed a more than proportional increase on that of the preceding year. The total gas production in 1897 was 47,475,511 cubic metres (1,676,672,682 cubic feet); being an increase of 2,964,807 cubic metres (104,706,842 cubic feet) over that of 1896. We miss from the report this year the customary detailed statement of the make of gas in each of the thirteen towns supplied by the Company, and cannot therefore state to what extent the different districts have contributed to the increased production. The gas supplied for illuminating purposes amounted to 76·14 per cent. of the total make—15·55 per cent. being for public lighting—while 18·63 per cent. was used for heating, cooking, and power purposes. The gas supplied for cooking and heating alone was 16·94 per cent. more than in 1896. Unaccounted-for gas rose, however, from 3·68 to 4·13 per cent. of the make; while the length of mains increased from about 475·4 to 498·3 miles. The annual consumption per burner was 3408 cubic feet, which was about 2 per cent. less than in 1896. The Company supplied 915 gas-engines, giving in all 4576¾-horse power. The make of gas per ton of coal fell from 10,941 cubic feet in 1896 to 10,847 cubic feet last year; while the coke used for firing the retorts rose from 16·06 per cent. of the weight of coal carbonized to 16·31 per cent. The electric supply station owned by the Company at Dessau showed an increase of 24·9 per cent. in the number of units supplied; while the gas consumption by motors at this station showed a considerable decrease per effective horse-power-hour.

The report of the Directors states that the continued satisfactory financial results of working are due to the prevalence of good trade generally. Special expansion of the gas industry in particular is ascribed to the incandescent system of lighting, and to the extended use of gas for heating and power purposes. The number of incandescent burners supplied increased during the year by about 49,000, and now amounts to more than a fourth of the total number of burners of all kinds. Prepayment meters, made at the Company's workshops at Dessau, were issued to the number of 1473; and they gave great satisfaction. The demand for these meters is enormous; and their supply to the poorer classes and lodgers will undoubtedly considerably extend the Company's business. A new contract for the lighting of the district of Stolpe and Wannsee from the Potsdam works was entered into; but the contract with the town of Lemberg expired on the 1st of September, and the works then passed into the hands of the Municipality. The special amortization fund for Lemberg covered the full value of the works; but the loss of the profit therefrom will be felt by the Company during subsequent years. The Board regret the loss, on Nov. 2 last, of one of their number—Herr Otto Mohr, who had for forty years given his services to the Company.

The gross profit on the year's working was 3,810,947·53 marks (about £185,900); and the net profit, 2,926,742·25 marks (about £142,280). After making the customary addition of 10 per cent. of the net profit to the reserve fund, and adequate contributions to the contingency and renewal funds, a balance remains sufficient to pay a dividend at the rate of 11 per cent. per annum, and to carry forward to this year's account the sum of 38,432·75 marks (about £1875). The dividend is at the same rate as in 1896, and 1 per cent. higher than in the eight preceding years. The extension of works has now made it necessary for the Company to raise more capital; and it is proposed to issue bonds bearing interest at the rate of 4 per cent. to the value of 5,000,000 marks. The last issue was in 1892, and bore interest at the rate of 4½ per cent. In the intervening period, the production of gas has increased by about 11 million cubic metres (about 388 million cubic feet).

BINGLEY GAS SUPPLY.

Annual Statement.

At the Monthly Meeting of the Bingley District Council on Monday last week, Mr. Gatecliff, the Chairman of the Gas Committee, made his annual statement regarding the operations of the department. He said that the quantity of gas made in 1897 was 86,856,000 cubic feet, as compared with 82,912,200 feet in 1896. The actual sales amounted to 80,785,400 feet; yielding a revenue of £10,530. The sale of coke produced £1249; and the tar and liquor £780—the total being a slight increase over the previous year. He pointed out that there was an increase in wages and materials in both the expenditure and maintenance accounts, amounting in all to £1253. Interest on loans absorbed £558, and the sinking fund £1175, from the gross profits, which amounted to £2491, the net balance remaining being £758. This was only about half of the sum at the end of 1896; but Mr. Gatecliff reminded the Council that the consumers had had the benefit of the last reduction in price, which was equivalent to £750 for the year. Gas-stoves had consumed 14,862,500 cubic feet, of the value of £1579—an increase in bulk of 1,213,000 feet. It was very largely in consequence of this consumption that a profit had been made. The capital of the gas-works was £21,291; and the estimated value of the plant, £43,159. The reserve fund at the beginning of the year was £3321; and the addition of the net profit to this made a total of £4079. But during the year there had been withdrawals on account of extensions amounting to £1529, reducing the reserve to £2549. Referring to the improvements made during the year, he said the storage capacity at the works had been increased to 528,989 cubic feet at a cost of £2400—an extension which had been found of much value during the foggy days of winter. A new station meter had also been put in at an expense of £320. He afterwards expressed his approval of a proposal to take £1070 from the reserve fund to extinguish the debt of £770 on the baths and £300 on the free library. In concluding, he gave it as his opinion that the time would soon arrive when the net price of gas could be made 2s. per 1000 cubic feet for the whole of the district, as against 2s. 1½d. net at present. It was subsequently decided, on the recommendation of the Committee to make the price of gas uniform over the extended district of Bingley from Jan. 1 last, and also to appropriate from the reserve fund the sums named to pay off the debt on the baths and free library.

INCREASED STORAGE AT THE STOKE GAS-WORKS.

Inauguration of a New Holder.

Last Wednesday afternoon, the Mayor of Stoke (Mr. F. Geen, J.P.) formally inaugurated, in the presence of a numerous company, among whom were the Managers of several neighbouring gas-works, a new gas-holder which has been erected for the Corporation by Messrs. W. C. Holmes and Co., of Huddersfield, at a cost of about £7000. The necessity for additional storage at the gas-works has been felt for some time; the consumption of gas having risen from 80 million cubic feet in 1886 to 106 millions last year—an increase of rather more than 30 per cent.; and the ceremony of Wednesday was the outcome of the resolution of the Gas Committee to provide it. The new holder, which has been constructed from designs prepared by the Corporation Gas Engineer (Mr. W. Prince), is in three lifts, and will contain 430,000 cubic feet of gas, enabling the Committee to meet a 30 hours' maximum demand. It works in a steel tank 90 feet diameter and 25 feet deep, which will hold a million gallons of water. The body of the holder is of wrought iron, supported by standards and lattice girders of a light and graceful character. Standing in front of the holder, the Mayor (who is Chairman of the Gas Committee) remarked that its general appearance was far in advance of anything which Stoke, at all events, had ever had in this way; and he had every reason to believe, from the experience they had already had, that it would work well, and do what was expected of it. He then opened the valve, and allowed gas to pass into the mains. The company afterwards, on the invitation of the Contractors, partook of light refreshments at the Gas Offices, where congratulatory speeches were delivered, and good wishes expressed for the success of the undertaking. Having given a *résumé* of the progress of the gas undertaking, the Mayor explained that the new holder formed a portion of the scheme upon which the Gas Committee had been working for the past two years. They first provided new purifiers, then erected a new engine-house and put in new boilers and additional machinery; and, as far as he could judge, it would take them eighteen months or two years more to complete the whole of the scheme. The expenditure upon these different works had been met, with the exception of five-sixths of the cost of the holder, out of the revenue; and he had not the least doubt that the cost which would be entailed by the other part of the scheme would be met from the same source. He referred to the many difficulties they had had to surmount during the progress of the excavation for the new tank, &c.; and paid a high tribute to their Engineer for his invaluable aid during the inception and execution of the work. The holder did credit alike to the Contractors and to the Corporation. His Worship concluded by asking the company to drink the health of the former, who, he said, had done other work for the Corporation. They erected for them, in competition as regarded price, the purifiers he had referred to, which were found to have worked admirably; and in competition again they had succeeded in obtaining the contract for the new holder. Mr. Percy F. Holmes, in reply, said the ground on which the holder stood was very treacherous; and it appeared at first as if the tank was going to be a troublesome job. But with the assistance of Mr. Geen and Mr. Prince, they managed to get over the excavating difficulty; and then it was comparatively plain sailing. They considered the holder one of the best they had erected. Speaking in support of the toast of "The Health of the Chairman and Vice-Chairman of the Gas Committee," Alderman Kirkham, referring to the division and considerable feeling that existed in the Council five years ago on the subject of the gas-works extension, admitted that he was wrong in taking the part he did in the opposition to the scheme, and that the Chairman of the Committee and those who thought with him were right. He had been led to think there was not room on the works for any extension to cope with the requirements of the town. But he was wrong. They were all liable to error; and he was there that day to acknowledge that he had been in error. He made the admission freely and frankly, and thoroughly endorsed the policy of the Gas Committee during the crisis that had taken place. The Mayor said he was deeply grateful to Alderman Kirkham for the remarks he had made. They might depend upon it that nothing had been so hurtful to him as the difference to which allusion had been made. Other toasts followed; and the company then separated.

The Vienna Gas Loan.—According to the "Neue Freie Presse," the above-named loan has been subscribed nearly twice over. The "Financial News" briefly comments upon this as follows: "So much the less credit to the subscribers." The Vienna Correspondent of the paper, writing last Thursday, said: "The subscription to the gas loan is really a moral *fiasco*. At the Vienna offices and the community savings banks, only 2,000,000 florins were subscribed for, and in all Austria only 18,000,000 florins. The plaster on this wound of the German banks is the news that negotiations between the community and the Tramway Company (whose chief shareholder is the German Bank) are approaching their end."

ELECTRIC LIGHTING AFFAIRS IN SHEFFIELD.

Gas and Electric Lighting Compared—A Reply to Sir Frederick T. Mappin.

More than usual interest attached to the annual meeting of the Sheffield Electric Light and Power Company, held yesterday week, in view of the fact that the recommended dividend was the largest yet paid, and that the shareholders were to be asked to confirm the action of the Directors in coming to terms for the sale of the undertaking to the Corporation. The Chairman of the Board (the Lord Mayor, Mr. Alderman Franklin) presided, and referred to the progress and sound financial position of the undertaking. He said that in 1893 the Company's gross income was £3555; and in 1897 £14,318. The profit last year (including £99 brought forward) was £11,491. The debenture interest required £1125; and from the balance the Directors recommended a dividend of 12½ per cent., which would absorb £9464, and leave £902 to carry forward. The output of electricity was 747,067 units, as compared with 131,752 units in 1893. These figures were all the more remarkable in that on Jan. 1, 1897, the Directors reduced the price of the current from 6d. to 5d. In 1893, the cost of production was 5·14d. per unit; in 1896, 2·23d.; and last year 1·56d. On the strength of this reduction, the price of the current would be brought down to 4d. at the end of this month. This would make, for the consumers, a reduction of 33⅓ per cent. in the course of fifteen months. Something had recently been said about a corresponding reduction in the price of gas. The charge had been reduced 2d. per 1000 cubic feet; but this was only equivalent to a reduction of 8 per cent. While gas had had 80 years clear start of the electrical industry, yet at the same time its younger and perhaps more hopeful rival was rapidly overtaking and "collaring" gas even on its own ground—that of cheapness. They had only to reflect on what was the price of gas when the gas undertaking was as old as the electric light undertaking now—the time when gas cost 8s. or 10s. per 1000 cubic feet—in order to be able to see the remarkable progress which was being made by the newer light. A great deal had been said about this question of cost; and there was one or two points he would like to deal with. Of course, from the point of view of general health, cleanliness, brightness, and coolness they maintained that there was no comparison between the electric light and gas; but he noticed that some other things had recently been said in defence of gas by the Chairman of the Gas Company (his friend, Sir Frederick Mappin), who was accustomed half yearly to trot out various bogies with regard to electricity which had only to be considered for a moment to be disposed of. A year ago they were told that electricity was a very dangerous thing for people to have in their houses. Certain explosions which took place in London were quoted in witness thereof; and chairmen of gas companies throughout the country had their minds filled with alarm as to what would be the future of the electric light undertakings. Now it so happened that ingenious gentlemen had been collating figures with regard to leakages of gas and the number of deaths arising from gas explosions; and if he chose to take the alarmist tack, he might send all the shareholders away very miserable lest they should meet with a gas explosion on their road home. It had been discovered that the calamities arising from explosions of gas were far in excess of any possible figures which might be urged with regard to the electric light, even taking into account the relatively larger number of persons who at present use gas. Another bogie which had been trotted out was that of cost; and it had filled the mind of Sir Frederick Mappin with alarm, that the ratepayers should have been called upon to pay the enormous cost of electricity for lighting the new Town Hall. What were the facts? The statement of Sir Frederick was that for three months ending Dec. 31, 1897, the cost of lighting the Town Hall by electricity was £210 17s.; whereas the cost of lighting certain municipal offices by gas during a similar period of the previous year was only £37 4s. 10d. Of course, he need not say that the things compared were not of the same kind. A comparison of the cost of illuminating the Town Hall by electric light should be made with the cost of illuminating the same building with a similar number of gas-lights; and if one took the Gas Company's own figures, and reduced them to candle power, one could prove absolutely that there was, during the three months of the later period, nearly four times as much candle-power supplied to the Town Hall as was furnished during the former period to the offices referred to by Sir F. Mappin. It would have been just as reasonable and fair to compare the cost of illuminating the Parish Church with the cost of illuminating the cabman's shelter outside it, or the cost of lighting Sir Frederick's own residence with the cost of lighting the lodge at the gates, as it was to compare the cost of lighting a great mansion like the Town Hall with the separate, scattered, isolated offices which the Corporation had before. The fact remained that those who became customers for the electric light had remained customers. Tradesmen and others knew their business perhaps better than any gas company or electric light manager could teach them. They knew the value of a penny or a pound in their expenses as well as anybody; and they would not pay more for a thing than it was absolutely worth to them. The satisfactory feature to the shareholders was that no consumers who once put in the electric light ever took it out again, and that those who had had it expressed themselves perfectly well satisfied with it, and went in for its extended use. As to the price, the case of Brighton had been quoted against Sheffield as a proof that, whereas the Sheffield Company had reduced the price to 4d., electricity could be supplied, as it was supplied in Brighton, at 1d. per unit after the first hour. An examination of the method of charging adopted in Brighton showed, however, that the real cost to the consumer there was actually greater than it was to the consumer in Sheffield. The Directors were convinced that in their undertaking the shareholders had a valuable property, and had cause to be satisfied with the progress made during the few years of its existence. At the present time they had 46 miles of pipes laid under the streets of the city containing 28 miles of cable; and many of these pipes would be available for future extensions to meet the wants of new customers. The report was adopted; and a dividend at the rate of 12½ per cent. per annum was declared.

The Proposed Transfer of the Undertaking Approved by the Shareholders.

At the close of the proceedings reported above, an extraordinary meeting was held for the purpose of considering the proposed transfer of the undertaking to the Corporation. Mr. E. T. Moore explained the terms on which it was proposed to sell. He said the consideration to be paid by the Corporation for the concern was an agreed amount of capital—viz., £124,472. This sum was cut up into two portions, one part to be paid in cash, £5972; and the remaining £118,500 was to be met by the Corporation issuing to the Company for every £100 of the amount £220 worth of Corporation 2½ per cent. stock, which could not be redeemed before 1925. The Company, however, had the option of requiring cash in its place at the rate of £213 8s. for every £220 worth of stock; the object of the option being to protect the shareholders against any depreciation in the value of the stock which might occur during the time that would be occupied by the Corporation in obtaining parliamentary sanction for taking over and working the undertaking. In addition the Corporation were to pay the value of the book debts owing to the Company, and to buy the stock and stores at the amount at which they stood in the balance-sheet on Dec. 31 last. The profits which were made in 1897 were reserved from the sale, and these would be available for dividends. Beyond this the Corporation had agreed (as from Dec. 31 to the date fixed for the completion of the purchase) to pay a dividend to the shareholders at the rate of 10 per cent. per annum. Other minor financial arrangements were also explained, after which a resolution approving of the transfer was unanimously passed.

METROPOLITAN WATER SUPPLY COMMISSION.

Sixteenth Day—Monday, March 21.

(*Viscount* Llandaff, *Chairman*, *Sir* John E. Dorington, Bart., M.P. *Sir* G. B. Bruce, M.Inst.C.E., *Major-General* A. de Courcy Scott, R.E., *Mr.* A. de Bock Porter, C.B., *Mr.* H. W. Cripps, Q.C., *and Mr.* R. Lewis.)

The sitting took place at the Westminster Town Hall.

The following Counsel are engaged: Mr. Pope, Q.C., and Mr. Claude Baggallay, Q.C., for the New River Company; Mr. Littler, Q.C., and Mr. Lewis Coward for the Kent Water Company; Mr. Pember, Q.C., for the Lambeth, East London, Grand Junction, and West Middlesex Water Companies; Mr. Rickards for the Chelsea Water Company; Lord R. Cecil for the Hertfordshire County Council; Sir Joseph Leese, Q.C., M.P., for the Kent County Council and Kent Local Authorities; Mr. Balfour Browne, Q.C., and Mr. Freeman, Q.C., for the London County Council; Sir R. Nicholson for the Middlesex County Council; and Mr. Gabriel P. Goldney (Remembrancer) for the Corporation of the City of London. The Southwark and Vauxhall Water Company are represented by Messrs. Bircham and Co.

Sir *John Lubbock*, in reply to Mr. Cripps, said it was very important in the interests of the ratepayers that the Companies should be economically managed. This could only be done from within; and he therefore suggested, as an additional measure of control, that one or two Directors should be appointed by the ratepayers. This proposal had not been discussed by the Water Committee of the Council.

Mr. Cripps: Does it occur to you that, if there is anything in the principle, it is applicable not only to the water companies, but to every company in England where the dividend has been limited by Parliament—railway companies for instance?

Witness: The railway companies' dividends are not limited by Act of Parliament; rates are.

I think they are, some to 8 and others to 10 per cent. Just assume that there are companies besides water companies that are limited in their dividends, would not the principle be applicable to them too?—I think it might be desirable. Witness added that the principle was already recognized in the case of the Indian railways.

The Chairman: Do your objections to purchase apply equally to a body directly constituted for the purpose, and representative of all the counties interested?

Witness: In some points that would, I think, be preferable; but so far as the financial question is concerned, my objection would equally apply. I understand the outside areas object to such a proposal, on the ground that their representation would be so small on such a Trust.

That might be modified?—Yes.

Major-General Scott: The Companies generally have to provide for the future; and if there is laxity or failure in carrying out the works which are to provide for the future, it is too late to take action when the actual defect occurs?

Witness: Yes; but I think the Water Companies have shown that they do look to the future. The only case of the kind suggested, so far as I am aware, was that of the East London Company. They went to Parliament on the ground that they had not enough water; but the Bill was opposed by Professor Stuart, who might be taken to represent the County Council, on the ground that they had sufficient. Supposing the control suggested were necessary, if the Water Companies were purchased by the County Council they would need to have some control over the Council, for I see no reason to believe that a Local Authority would look forward with greater prescience than the Companies do. As the Companies would suffer very heavily in dividends in case of failure, perhaps they are more likely to look forward than a Local Authority would be disposed to do.

By Mr. Freeman: The members of the Water Committee of the County Council were no doubt largely in favour of purchase. He could not positively say there was another member favourable to it; but he thought there were two such.

Mr. Freeman: In itself, is there any particular reason why what has been successful at Birmingham, Liverpool, and Manchester, should not be also successful in London?

Witness: I am not really prepared to say that it has been financially successful in these cases; and I have endeavoured to lay before the Commission certain reasons which apply to London which would not apply to either of the places mentioned.

Is it solely on financial grounds that you would object to the transfer?—Not solely.

What else?—I think it is important to have a body watching over the purity of the water. If there were an external body of great power watching over the water supplied by other bodies, the water is likely to be of much higher quality than if it were supplied by a body—even the local authority—having no such check. I quite agree that there has been

a large number of cases of transfer of water undertakings to local authorities; but I have never heard of an instance where the inhabitants had desired and carried out a return of the undertaking to a water company. It would be almost impossible.

Do you know that there have been cases where, many years ago, corporations have been empowered to supply water, have found themselves unable to do it, have handed it to a company, and then years after rebought from the company?—No.

Mr. RICKARDS: Was it in this century?

Mr. FREEMAN: Yes, a day or two ago—the Yeovil case.

Witness, in reply to further questions as to the Local Government Board having control over the County Council (supposing the Council purchased the Companies), said it would require a very strong case for the Local Government Board to enter into conflict with the Council. He was disposed to think it would be a wise thing to go a long distance—say, to Wales—for further water.

Mr. FREEMAN: Supposing it is necessary to supplement this supply by going to Wales, or any other distant place, do you suggest, as a matter of practical politics, that the Companies could be required to do this?

Witness: Well, I have made a different suggestion; but I do not think it is impossible. As to the Companies amalgamating for the purpose of obtaining this supply, witness suggested that there might be two Companies—one for the north, and one for the south of the Thames. The Companies had joined together for the Staines scheme, which was a very important one; and he did not think it impossible that they might combine to bring water from Wales. As to his suggestion that the County Council should bring water from Wales and sell it to the Companies, he admitted that he knew of no similar case. There were, however, instances where municipalities brought water for their own purposes from a distance, and also sold it in bulk to outside authorities or companies. Witness went on to direct attention to the vast amount of work already devolving upon the Council; the agenda of the last meeting consisting of 49 pages, and 150 different resolutions. In view of the enormous work which the Council already had to do, it was important for the Commission to consider whether they should be given more. Regarding his statement that the saving resulting from the acquisition of the Companies by the County Council—put by Mr. Haward, the Comptroller of the Council, at £58,000—was largely hypothetical, he admitted that there might be some saving in the cost of collection, but not so much as anticipated. There might also be a saving in law expenses. Further questioned as to the use of the two Directors he suggested on the Board of a Company, witness said they would have nothing to do with equalizing the rates over London; but they would be able to see that the Companies were well and economically managed. In regard to those Companies which were already paying maximum dividends, the result of any saving would be *ipso facto* to reduce the price of water. His objection to purchase, in the case (say) of the West Middlesex Company, was that the purchaser could not be better, and might be worse, off after the purchase than before.

By Sir J. LEESE: He understood the position of the Kent Authorities to be that things should be left as they are; but assuming there was to be transfer, either to a Trust or to the County Council, they would prefer to be able to supply the district outside the Metropolitan area now supplied by the Kent Company.

Major-General SCOTT remarked that the moment they split the area, the question arose of arranging for the delivery of water from one to the other; the water sources being chiefly outside the Metropolis.

Sir J. LEESE pointed out that Kent might find itself in the position of having to supply water to all London—of being denuded of its own water to supply London, and then having to go to Wales or elsewhere to get more.

Mr. H. W. CRIPPS, on behalf of the County Council, said these points had been discussed between the Council and the parties concerned; and no difficulty was found in coming to an agreement provisionally between the Council and these Authorities. By the general concurrence of geological experts, it was agreed that practically the Kent Company were limited to drawing 27½ million gallons a day from their sources, though, as a matter of law, they could take as much as they could get.

Mr. COWARD said the Kent Company would contend that the figure of 27½ million gallons would have to be doubled or trebled.

By Mr. RICKARDS: Financially the result would be about the same, whether the Companies were unified in the hands of a Water Trust or of the County Council. Two forms of control were desirable—first, as regarded the purity, which appeared to be given by the Acts of Parliament, and especially by the Act of last year; and, secondly, some control to secure economical management, which might be effected by the appointment of Directors as he suggested. The great problem before Lord Balfour's Commission seemed to be whether they should utilize the Lea and Thames Valley supplies, or whether they should go to Wales. Only one of these propositions was gone into; but it seemed to him that both must be considered before it could be said which was the best.

Mr. *C. A. Whitmore*, M.P., examined by the CHAIRMAN, said he had been for three years an Alderman of the County Council; but he had not served on the Water Committee. If the undertakings of the Companies were purchased with a view to their being vested in, and subsequently managed by, a public authority, that authority must be, either in name, or virtually, the London County Council.

The CHAIRMAN: You say that on account of the enormous preponderance of the rateable value and population of the Administrative County of London?

Witness: Yes. It is impossible, in my judgment, to have a composite Water Board for the whole of London without giving a preponderating voice to the County Council; and if you do this, you make legislation practically impossible. This was shown by a recent Bill of the Government, in which only the barest proportion was given to the County Council; yet the Bill had to be dropped.

Why should there be any proportion? The 10,000 people outside want water as much as the 100,000 inside; and one does not quite see why the 10,000 should not have an equal voice with the 100,000 in such a matter?—Well, the whole policy of purchase comes from those who are supporters of the Progressive policy of the London County Council. Continuing, witness said he was a supporter of the Council as an

GAS AND WATER COMPANIES STOCK AND SHARE LIST.

Referred to on p. 704.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 14	10½	Alliance & Dublin 10 p. c.	24—25	..	4 4 0
100,000	10	,,	7½	Do. 7 p. c.	16½—17½	..	4 5 8
300,000	100	Jan. 3	5	Australian 5 p. c. Db.	105—107	..	4 13 6
200,000	5	Nov. 11	6½	Bombay, Ltd.	5¾—6½	..	5 4 0
40,000	5	,,	6½	Do. New, £4 paid	4½—5½	..	4 19 1
380,000	Stk.	Feb. 24	12	Brentford Consolidated	295—300	..	4 0 0
240,000	,,	,,	9	Do. New	228—233	..	3 17 3
50,000	,,	,,	5	Do. 5 p. c. Prf.	140—145	−2	3 9 0
159,375	,,	Dec. 15	4	Do. 4 p. c. Db. Stk.	134—138	..	2 18 0
220,000	Stk.	Sep. 15	11½	Brighton & Hove Orig.	275—280	..	4 2 3
218,820	,,	,,	8½	Do. A. Ord. Stk.	201—205	..	4 2 11
933,500	Stk.	Feb. 24	5	Bristol, 5 p. c. max.	127—132	..	3 15 9
420,000	20	Sep. 30	11½	British	56—57	..	3 19 0
50,000	10	Mar. 11	11½	Bromley, Ord. 10 p. c.	25—27*	..	4 5 2
75,000	10	,,	8½	Do. 7 p. c.	20—22*	..	3 17 3
500,000	10	Oct. 14	6	Buenos Ayres (New) Ltd	9½—10	..	6 0 0
98,122	Stk.	Dec. 30	4	Do. 4 p. c. Db. Stk.	98—100	..	4 0 0
150,000	20	Mar. 11	8½	Cagliari, Ltd.	30—31*	..	5 6 5
100,000	10	Sep. 30	8	Cape Town & Dis., Ltd.	17—18	..	4 8 11
50,000	50	Nov. 2	6	Do. 6 p. c. 1st Mort.	59—61	..	4 18 5
550,000	Stk.	Oct 14	13½	Commercial Old Stock	340—345	..	3 18 3
200,750	,,	,,	10½	Do. New do.	255—260	..	4 0 9
200,750	,,	Dec. 15	4½	Do. 4½ p. c. Db. do.	154—157	..	2 17 4
800,000	Stk.	Dec. 15	12	Continental Union, Ltd.	235—235	..	5 2 2
200,000	,,	,,	9	Do. 7 p. c. Prf.	208—213	..	4 4 6
51,600	Stk	Feb. 24	14	Croydon A 10 p. c.	310—315	..	4 8 11
168,400	,,	,,	11	Do. B 7 p. c.	255—265	..	4 3 0
535,000	Stk.	Feb. 24	5½	Crystal Palace Ord. 5 p. c.	128—133	−2	3 18 11
60,000	,,	,,	5	Do. 5 p. c. Prf.	140—143	..	3 9 11
486,090	10	Jan. 27	11	European, Ltd.	24—25	−1	4 8 0
354,060	10	,,	11	Do. £7 10s. paid	17—18	−½	4 11 9
5,922,110	Stk.	Feb. 10	12½	Gaslight & Coke, A. Ord.	288—293	−5	4 7 0
100,000	,,	,,	4	Do. B, 4 p. c max.	118—123	−2	3 5 1
665,000	,,	,,	10	Do. C, D, E, 10 p. c. Prf.	305—315	−2½	3 3 6
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	150—155	..	3 4 6
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	220—225	..	3 6 8
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	195—200	..	3 10 0
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	305—315	−2½	3 3 6
476,000	,,	,,	6	Do. K, 6 p. c. Prf.	183—188	..	3 3 10
1,061,150	,,	Dec. 15	4	Do. 4 p. c. Db. Stk.	133—136	..	2 18 10
294,850	,,	,,	4½	Do. 4½ p. c. do.	153—155	..	2 18 1
958,000	,,	,,	6	Do. 6 p. c. do.	202—207	..	2 18 0
70,000	10	Oct. 28	8	Hongkong & China, Ltd.	14—15	..	5 6 8
3,800,000	Stk.	Nov. 11	10	Imperial Continental	213—218	+1	4 11 9
376,400	100	Feb. 1	4	Do. 4 p. c. Dbs. Red.	98—101	..	3 19 3
473,600	Stk.	Feb. 10	3½	Do. 3½ p. c. Db. Stk. ,,	103—106	..	3 6 0
560,000	100	Oct. 1	5	Met. of Mel- 5 p. c. Db.	112—114	..	4 7 8
250,000	100	,,	4½	bourne 4½ p. c. Db.	109—111	..	4 1 1
75,000	5	Dec. 15	6	Malta & Medn., Ltd.	5½—6	..	5 0 0
541,920	£0	Nov. 11	5	Monte Video, Ltd.	15½—16½	..	6 1 3
617,946	Stk.	Feb. 24	9½	Newc'tle & Gatesh'd Con.	235—240	..	4 1 3
252,325	Stk.	Jan. 3	8½	Do. 3½ p. c. Db. Stk.	115—120	..	2 18 4
150,000	5	Nov. 26	8	Oriental, Ltd.	8—8½	..	4 14 2
135,000	5	,,	8	Do. New, £4 10s. pd.	7—7½	..	4 16 0
15,000	5	,,	8	Do. do. 1879, £1 pd.	1½—2	..	4 0 0
60,000	5	Mar. 11	7	Ottoman, Ltd.	4½—5*	..	7 0 0
420,000	100	Nov. 2	6	People's Gas 1st M. Bd.	104—109	..	5 10 1
500,000	100	Dec. 1	6	of Chicago 2nd do.	103—108	..	5 11 1
848,070	10	—	—	River Plate Ord.	9¼—9¾	..	—
250,000	Stk.	Jan. 27	4	Do. 4 p. c. Db. Stk.	99—101	..	3 19 3
250,000	10	Sep. 30	10	San Paulo, Ltd.	16—17	..	5 17 3
135,000	Stk.	—	10	Sheffield A.	250—253	..	3 19 0
209,053	,,	—	10	Do. B.	250—253	..	3 19 0
447,427	,,	—	10	Do. C.	250—253	..	3 19 0
5,531,250	Stk.	Feb. 24	5½	South Metrop., 4 p.c Ord	136—139	−1	3 15 6
1,460,000	,,	Jan. 13	3	Do. 3 p. c. Db. Stk.	104—107	..	2 16 1
60,000	Stk.	Mar. 11	12	Tottenham and A.	285—295*	..	4 1 4
60,000	,,	,,	9	Edmonton B.	205—215*	..	4 3 9
182,380	10	Dec. 20	7	Tuscan, Ltd.	13½—14½	..	4 16 7
149,900	10	Jan. 3	5	Do. 5 p. c. Dbs. Red.	100—103	..	4 17 1
				WATER COMPANIES.			
746,164	Stk.	Dec. 30	10½	Chelsea, Ord.	333—338	..	3 2 2
150,000	,,	,,	5	Do. 5 p. c. Prf.	177—180	..	2 15 6
160,000	,,	,,	4½	Do. 4½ p.c. Pf. Stk., 1875	157—160	..	2 16 3
175,785	,,	Sep. 30	4½	Do. 4½ p. c. Db. Stk.	160—165	..	2 14 6
1,720,560	Stk.	Oct. 14	8†	East London, Ord.	224—229	..	3 9 10
654,740	,,	Dec. 30	4½	Do. 4½ p. c. Db. Stk.	161—164	..	2 14 11
390,000	,,	,,	3	Do. 3 p. c. Db. Stk.	105—107	..	2 16 1
700,000	50	Dec. 15	7½	G'd Junct'n, 10 p. c. max.	120—125	..	3 0 0
295,000	Stk.	,,	4	Do. 4 p. c. Db. Stk.	147—150	..	2 12 8
708,000	Stk.	Feb. 10	13	Kent	358—363	..	3 11 8
160,000	,,	,,	7	Do. New, 7 p. c. max.	213—218	..	3 4 3
1,043,800	100	Dec. 30	10	Lambeth, 10 p. c. max.	298—308	..	3 6 0
406,200	100	,,	7½	Do. 7½ p. c. max.	228—233	−2	3 4 4
350,000	Stk.	Sep. 30	4	Do. 4 p. c. Db. Stk.	147—150	..	2 13 4
500,000	100	Feb. 10	13	New River, New Shares	445—450	..	2 17 10
1,000,000	Stk.	Jan. 27	4	Do. 4 p. c. Db. Stk.	145—150	−2	2 13 4
902,300	Stk.	Dec. 15	6	Southw'k & V'xhall, Ord.	155—160	..	3 15 0
126,500	100	,,	6	Do. do. 7½ p. c. max.	152—157	−8	3 16 5
489,200	Stk.	,,	5	Do. do. 5 p. c. Prf.	174—179	..	2 15 10
1,019,585	,,	Oct. 14	4	Do. 4 p.c. A Db. Stk.	146—149	..	2 13 8
1,155,066	Stk.	Dec. 15	10	West Middlesex	306—311	−4	3 4 8
200,000	,,	,,	4½	Do. 4½ p. c. Db. Stk.	162—165	..	2 14 7
200,000	,,	Mar. 11	3	Do. 3 p. c. Db. Stk.	105—107*	..	2 16 1

* Ex div.

* Ex div.

† Next dividend will be at this rate.

institution, and had always dissociated himself from those who wished to diminish its authority or powers. But the Council had the great defect, in that it was essentially a political and a partizan body; and in this respect it was to be distinguished absolutely from the county council of any great town, and especially of any rural county. He dwelt at considerable length on this fact. Suppose that a Water Committee, just before an election, found that they had made a bad bargain, he should look forward with almost positive fear to what the Council would do. He was afraid the representatives of the poorer districts would not be thinking of the ratepayers' interests, but of the charges; whereas the representatives of the wealthier areas would be thinking of the rates, and not of the charges. Both sides would be thinking, not of the business merits of the matter, but of the next election. He was therefore most anxious that this great business should not be handed over to the Council. He hoped the time would come when the County Council would not be on both sides so political a body as it was now; but seeing that at present they could not trust either party, he held the opinion that the Council was not fitted, on commercial and business principles, to manage so great an industrial undertaking. The management of the water supply was just the kind of work which the Council was not well fitted to perform.

Sir J. DORINGTON: Although you say the County Council is the only body that can buy, you deprecate them buying?

Witness: Yes. Further, he did not wish to see the Council controlling any large body of labour, such as the employees of the Water Companies. Speaking generally, the Moderate party had gone in for purchase, but without subsequent management by the Council. His own impression was that the grievances against the Water Companies had been very much exaggerated.

The CHAIRMAN: Except the charges?

Witness: Quite so. My own view is that the Water Companies ought to be forced to amalgamate—that what has happened with great good to London in the case of the Gas Companies and the Dock Companies, ought to take place with the Water Companies. The grievances were to a large extent local, and they were confined to the poor districts. There were, however, inequalities in the charges, and want of consideration on the part of the poorer Companies to their consumers, but not on the part of the wealthier Companies.

Major-General SCOTT: In what respect want of consideration?

Witness: Well, in the case of a frost, not helping the consumers sufficiently. Another grievance was the want of communication between the systems of the Companies, one result of which had been that there was a water famine in one part of London while a Company in another part had plenty of water. If the Water Companies were formed into three, they would make a famine impossible. They might prevent one Company being so parsimonious as not to be considerate to the consumers; and they might get economy in administration. Having done this, he could discover no practical grievance which either ratepayers or consumers would have. He could not see that control was much wanted, or would do much good. He had lived in many houses in London, and had no grievance against the Companies. There was nothing in the present situation which required so drastic a remedy as purchase or control, whether by the County Council or any new authority. He was certain the majority of the Progressives, and of the Moderates too, on the County Council would object to anyone but the Council purchasing the Companies.

Sir J. DORINGTON: Assuming the Welsh scheme is believed to be necessary, by whom should it be carried out, supposing the *status quo* is maintained?

Witness: Well, I speak with the greatest diffidence on that point. I should say it ought to be carried out by the London County Council.

The CHAIRMAN remarked that this would mean that the London ratepayers would have to pay for ten years for bringing in the additional supply, though there would be absolutely no return.

Replying to a question from Mr. Pember, the CHAIRMAN said the Commission would probably sit the following Monday for the last time before Easter—meeting again on April 18.

The Commission then adjourned till yesterday (Monday); witness's examination not having been concluded.

The seventeenth sitting of the Commission was held yesterday, at the Westminster Town Hall—Lord Llandaff presiding. Mr. C. A. Whitmore, M.P., one of the Moderate members of the London County Council, who was under examination when the Commission adjourned on the last occasion, was recalled, and gave further evidence. He said he attached the greatest importance to the amalgamation of the Water Companies, either into one body or into three groups; and he suggested this step as a partial solution of the present problem.

EAST LONDON WATER-WORKS COMPANY.

Half-Yearly Report and Accounts.

The report which the Directors of the above-named Company will present at the half-yearly meeting of shareholders on the 7th prox. opens with the satisfactory statement that the increase in the water-rates in the six months ending Dec. 25 amounted to £10,180, and the decrease in the expenditure to £3592. This is borne out by the accounts, which show that the revenue from all sources in the second half of 1896 was £164,843; whereas in the corresponding period of last year it was £175,755. The expenditure on the maintenance of works and plant in the six months ending Dec. 25, 1896, was £59,456, and on management £11,944—together, £71,400; in the latter half of last year the figures were £55,739 and £12,069, making together £67,808. The West Warwick reservoir was completed and the water turned into it on the 22nd of September last; and it has been gradually and successfully filled. The Company have now eleven subsiding and storage reservoirs, covering an area of 316 acres, and having a capacity of 1215 million gallons. All the works have been maintained by the Engineer (Mr. W. B. Bryan, M.Inst.C.E.) in an efficient condition. The new services connected during the past half year

NEW "PENNY-IN-THE-SLOT" COOKERS

Arranged Specially for Prepayment Meters.

Greater Variety than any other Maker.

Nos. 402 and 3402.

All Parts Rapidly and Cheaply Replaced.

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Very Simple and Strong.

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LIMITED.

ESSEX WORKS, BIRMINGHAM; and 105, CHEAPSIDE, LONDON.

numbered 2767; bringing up the total to 192,538. With regard to the quality of the water, the Directors point out that the reports of Sir Edward Frankland as well as those of Sir William Crookes and Professor Dewar continue to show that it is of a very high standard. Reference is made to the Royal Commission now inquiring into the water supply of the Metropolis, who have been readily furnished by the Directors with much tabulated and statistical information for which application was made. The balance of revenue applicable to dividend is £88,433, compared with £69,008 this time last year. The Directors recommend a dividend at the rate of 8 per cent. per annum. This will absorb £68,822, and leave an unappropriated balance of £19,611.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Winter has arrived in the end of March. The balmy breezes and azure skies we have been accustomed to have given place to a north-easterly gale of intense coldness, a leaden firmament, and drifting showers of snow. Cloudy weather may yet ensue; and in view of this possibility, it may be advisable on the part of gas managers not to slacken off deliveries of coal yet. The cold is not agreeable, and the agriculturist will probably regard the snow with unfriendly eyes, because seed-time is due, when he loves to have dry weather; but there are others who would be delighted to see a copious downfall of either snow or rain. There has been so little for many months, that water reservoirs are beginning to get low; and if they cannot be kept full at this season of the year, the outlook for the summer, for those who are responsible for the water supply of large towns, is far from cheerful. In Edinburgh, it is already announced that the Water Trust cannot allow the streets of the city to be watered, because of the condition of the reservoirs. Unless, therefore, there be copious rainfalls in the near future, the prospect is decidedly serious.

With the disposal this week of the Edinburgh and Stirling Gas Bills by a House of Lords Committee, I may say that to me interest in the parliamentary session is over. The Bills have, of course, to run the gauntlet of the Commons Committee; but having taken the first fence successfully, there is not so much risk of the second bringing them down. I was misled by a London correspondent into thinking that both Bills would be speedily disposed of; the one being, according to him, expected to be taken on Monday, and the other on Tuesday. As it turned out, however, progress was not quite so rapid as this; the two Bills occupying the five working days of the parliamentary week. It is satisfactory to know that, though they have taken up a longer time than may have been anticipated, they have both come out favourable to the gas interest.

The Edinburgh Bill passed easily. That the promoters were aware that they were treading on safe ground, is shown by the fact that some of their most important witnesses were entrusted to their Junior Counsel for examination. For the promoters, a better display of engineering evidence could not have been obtained than that which was submitted by Mr. W. R. Herring, Mr. George Livesey, and Mr. Corbet Woodall. The two opponents of the measure had no attack to make upon it from the engineering side. They confined their efforts to the sentimental, which is a strong force in the mental constitution of residents in and around Edinburgh, but which does not appeal strongly to the parliamentary mind. The great weakness of their case was that, while claiming damage for injury to a first-class residential district, they could not point to a new house having been erected in the locality since 1849. The legal effect of this was to altogether prevent their leading evidence as to anticipated depreciation. There is one part of the evidence for the opponents which surprises me. It is that of Messrs. Welsh and Aitken, who professed the belief that the gases emanating from a gas-works would be injurious to plant life. I thought that this notion was exploded, even so far as the general public were concerned; but I certainly did not expect to find it aired by gentlemen of a scientific turn of mind. Apart from the fact, which is well known, that plants flourish and thrive, not only alongside but inside gas-works, reason would point to the fallacy of the evidence. If, as Professor Aitken says, the concentrated washings of the smoke and fumes of the gas-works, which would be carried down by rain, would be most injurious to vegetation, how does it happen that this result is not experienced in connection with the smoke and fumes from the chimneys of other public works, as well as with the great consumption of coal in dwelling-houses? I am not to be taken as saying that a smoky atmosphere is favourable to the growth of plants. It is well known to have a stunting effect; but then gas-works do not produce smoke. As to fumes, if they be discharged into the atmosphere at a sufficient height they soon disperse; and even if brought down by rain, the proportion which would descend would be distributed over so wide an area that its effect would be *nil*. The Commissioners have given an undertaking not to construct gas-works upon the western portion of the site, which is that nearest to the objectors' property, nor to use it as a tip for refuse, for ten years; and even then not without parliamentary sanction. They are quite safe to do this. Before ten years are over, it is probable that the nearest property will be taken for a public works, because it will be more profitable to convert it into an industrial district than to endeavour to attach the character of residential to it, which it does not possess; and then there will no longer be a question of amenity.

The passing of the Stirling Gas Company's Bill was a more satisfactory piece of work than was even that of the Edinburgh Bill. The opposition was much more powerful; and its failure is all the more matter for congratulation. Until the Bill went before the Committee, no one could have said what the opposition was to be. Then it turned out to be no more than that the Corporation wished time to consider as to whether they should not adopt the Burghs Gas Supply Act, and proceed to acquire the Company's undertaking in a regular manner. I venture to state that nobody outside the Corporation understood this to be their position; and I go further, and say that had a desire on the part of the Corporation to have time to consider a transfer been communicated to the Company, the request would have been granted. But the tone of the opposition all through was, in the language of a Stirling gentleman to myself, "We don't want their works." I rather fear that Counsel, when he went before the Select Committee, in

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

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WINDSOR STREET WORKS, BIRMINGHAM	2,000,000
SALTLEY WORKS, BIRMINGHAM	2,000,000
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SWINDON (New Swindon Gas Co.)	120,000
SALTLEY WORKS, BIRMINGHAM (Second Contract)	2,000,000
WINDSOR STREET WORKS, BIRMINGHAM (Second Contract)	2,000,000
HALIFAX	1,000,000
TORONTO	250,000
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ST. CATHERINES (Remodelled)	250,000
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ST. CATHERINES (Second Contract)	250,000
BUFFALO, N.Y.	1,500,000
WINNIPEG, MAN.	500,000

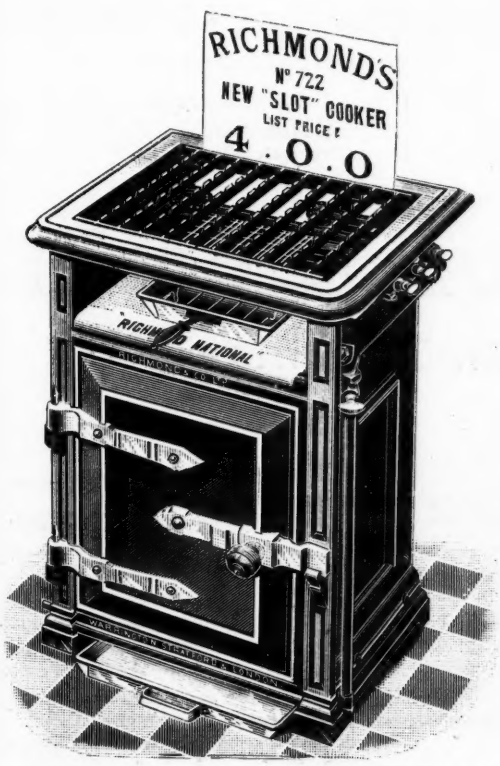
order to get his side out of a tight place, and in the exercise of his authority, formulated the doctrine that all they wanted was delay, and that the effect will be to make some of the members of the Corporation look foolish when they return home. The opposition have, in fact, succeeded in nothing, except in showing their own impotence. They interpreted the opinions of the old ladies of Stirling, of both sexes, as the voice of the community; but they have found that they could not persuade a Parliamentary Committee to take their view. I understand that they are claiming to have reduced the Company's capital from £60,000, which was the sum proposed in the Bill, to £40,000. But it was the Company' own witnesses who spoke to £40,000 as the value of the existing works; and this figure would have been put forward even if the Corporation had not been present. Then they say the initial price of gas has been reduced from 3s. 8d. to 3s. 6d. per 1000 cubic feet. This, again, was the suggestion of the Company's witnesses. A more complete vindication of the position of the Company could not have been obtained. As adjusted, the capital is to be £30,000, to bear 10 per cent. as the maximum dividend; £10,000 old capital, to bear 5 per cent.; and £10,000 of debentures, also to bear 5 per cent. That is a total capital of £50,000 authorized. If the Corporation still wish to acquire the undertaking, they will not get it for less than £50,000, if even at this figure. But if they should get an arbitration court to fix the capital at £50,000, and if 10 per cent. were added for compulsory sale, the amount would be £55,000; and this sum, with the costs of the proceedings in Parliament, would not fall far short of the £62,697 which was fixed by it would be found that the town would have done better to have ratified Sheriff Lees last year. Were the costs of last year's proceedings added, the proposals then made. The community will find out, when too late, that they have been blindly following men as blind as themselves.

Ex-Bailie Cuthbert has been elected Convener of the Works Committee of the Perth Gas Commission, in room of Bailie Wright, resigned. He has been in the Town Council since 1887, and has therefore a large experience of the public life of the city. On Wednesday last, the new Convener, along with the Town Clerk, visited Glasgow, with a view to enlisting the services of Mr. W. Foulis, as Consulting Engineer in connection with the plans for the new gas-works. The following day a private meeting of the Commission was held, at which it was reported that Mr. Foulis's name was suggested by Mr. Thomas Whimster, the late Manager at Perth, and that Mr. Foulis had expressed his willingness to place his services at the disposal of the Commission. Mr. Foulis was accordingly appointed; and it was arranged to send the plans of the new works, and everything relative thereto, to him for consideration as to whether they should be modified or whether the Commission should seek further borrowing powers. Mr. Foulis's appointment brings out this peculiar result—that as his system of mechanical stoking is the chief rival to that of West's Gas Improvement Company, and as the Perth Gas Commission have been in close communication with, if they have not actually entered into contract with, the latter Company, Mr. Foulis will be in the position of either having to concur in the adoption of a rival's scheme, or find ways and means of setting it aside. It is but a few weeks since the Commission agreed to write to West's Company asking for some relief. Is this appointment of Mr. Foulis an outcome of that request?

Mr. Foulis is now Consulting Engineer for the two Corporations of Perth and Dundee. He is undoubtedly at the head of the gas industry in Scotland, and cannot be too much consulted about renovations in gas-works. In this view, the following letter is strange reading. It appeared in the "Dundee Advertiser" of yesterday. As will be seen, it is a reply to a previous letter, which I have been unable to lay my hands upon; but it contains enough to make plain what the drift of the correspondence is. The writer says:

> Your correspondent "Anglo-Scot Manager" seems to arrogate to himself the position of adviser to the Perth and Dundee Gas Commissioners. As a Scotch gas manager in charge of English works, perhaps I may be allowed to express my opinion. It is generally admitted in England that Mr. George Livesey, of the South Metropolitan Gas-Works, London, is the leading gas engineer of the profession; and Mr. Livesey has tried both systems, I believe, and still pins his faith to machine stoking. I have tried both, and prefer machine stoking, which, by the way, is not intricate; and I am prepared to prove that expenditure of capital and my working results per mouthpiece, per retort, and per ton of coal, compare more favourably with one system than the other. I object to the statement that all the experienced members of the profession are at one with Mr. Corbet Woodall in his remarks as President of the Institution of Gas Engineers; for though I do not hold myself to be a shining light, yet I have a fair standing among my brethren. I do not consider Perth people have made a mistake, only I hope they will not "swop horses while crossing the stream," remembering that, while slopers are very good in their way, mechanical stoking is better.—I am, &c.,
>
> SCOTCH GAS ENGINEER.

There seems to me to be something beneath this; but I am puzzled to know what it is. Gas managers are not in the habit of writing anonymous letters to newspapers on subjects upon which they have not been consulted. I therefore dismiss the thought that an "Anglo-Scot Manager" wrote to the "Dundee Advertiser," or that this letter is the production of a Scotch gas engineer at all. I incline to the opinion that someone, and probably the same party, not to say the same person, has assumed those names. To think otherwise would lead to the almost certain identification of the writers. How many Englishmen are gas managers in Scotland? and how many of them are in favour of inclined retorts? To be straightforward, I know of only one; and I know this gentleman would not have interfered where he was not asked. Then how many Scotchmen are gas engineers of fair standing in England? There are a few; but if the question be again asked as to how many of them are in a position to give an opinion as to slopers, the circle is made very small. I am not so well acquainted with England as with Scotland; but, so far as my knowledge goes, the circle would again enclose only one works. The manager there, too, I am convinced, is not a likely reader of the "Dundee Advertiser;" and even if he were, it is not probable that he would have interfered where he was not asked. I therefore incline to the opinion that these anonymous signatures are not genuine, but have been adopted in ignorance of the fact that they were likely to lead to certain gentlemen of probity being suspected of writing them. A contractor might have an interest in getting the letters written; but a contractor would know the circumstances



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that I have narrated, and would have avoided the pitfall. When this point is reached—and it is the farthest that I can go—it almost seems that the letters are the emanations of some local gentlemen who, in the heat of controversy, have resorted to nomenclature which they expected to be more convincing than would be "A Citizen," or "A Gas Consumer;" thereby perpetrating a double subterfuge, and leading to the detection of their tactics.

The Edinburgh and District Water Bill has been passed by a Committee of the House of Lords. As no conditions have been imposed, this seems to be a victory for the Water Trust, and points to the view that Parliament has dealt more kindly with them than have the Law Courts. They played a bold game, but seem to have come off with the honours. I write tentatively, however, not having seen the Bill, and not knowing what may be the outcome of the actions which are at present in dependence between them and the Clippens Oil Company. I rather fancy that, however they may fare in Parliament with the Bill, the Trust will not escape the necessity for acquiring the minerals in the Pentland estate under their pipe-track, or running the risk of the pipes being fractured by subsidences. But even in this event they will be in an improved position, because they will possess an alternative main, and will not have the anxiety upon them of the district being suddenly deprived of water by a fracture of the main, and of their being consequently obliged to come to terms with the Oil Company. It rather looks, too, as if they will still be exposed to a claim for damages by the Oil Company for the cessation of their works during the dispute. But, of course, their action having been legalized, after the event, such a claim will be greatly modified. This is all, it must be borne in mind, subject to the passing of the Bill by the House of Commons, which may be more difficult than has been the case in the Lords.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March* 26.

Sulphate of Ammonia.—The market is still quiet; but only a slight decline in values has to be recorded—to-day's quotations being £8 17s. 6d. to £8 18s. 9d. per ton, f.o.b. the usual shipping ports. A fair amount of business has been done during the week; but supplies being rather plentiful, buyers have been able to take their own time, and have only been induced to operate by declining prices. Direct business has been checked by low quotations abroad for April delivery. So far, the home demand has been satisfactory, and at about the present level of prices, the season's consumption should again be large. In the forward position, buyers generally do not show much interest, though a large contract is reported to have been taken for delivery during summer at a price below current value.

Nitrate of Soda sticks at 7s. 6d. per cwt. on spot for fine quality, notwithstanding heavy deliveries and reduced stocks.

LONDON, *March* 26.

Tar Products.—A good inquiry exists for carbolic acid, particularly in the form of sixties. Crystals, however, have not responded proportionately to the better values of crude carbolic. Pyridine is in better request; and there are more buyers than formerly. The light products of tar are lower in value. Benzols are particularly weak; while naphthas are also quoted lower. A capital business is being done in creosote; and, although naphthalene is somewhat neglected, it is moving off pretty freely on old contracts. Anthracene continues steady, with no pressing sellers. There is no change in the position of pitch; both buyers and sellers keeping off the market. This is not surprising, since the season of shipment is rapidly drawing to a close, and most buyers will have bought their requirements; while sellers have very little stock, and, owing to the disappointing quantities of tar dealt with, the production of pitch is much below the average.

Values to-day are: Tar, 12s. to 15s. Pitch, east coast, 19s. 6d.; west coast, 15s. to 16s. Benzols, 90's, 1s. 1½d.; 50's, 1s. 3½d. Toluol, 1s. 6d. Solvent naphtha, 1s. 4d. Heavy naphtha, 1s. 2d. Crude, 30 per cent., naphtha, 6d. Creosote, 2¼d.; liquid, 2⅜d. Heavy oils, nominal, 42s. 6d. Carbolic acid, 60's, 2s. Naphthalene, 50s.; salts, 30s. Anthracene, "A," 5½d.; "B," 4½d.

Sulphate of Ammonia.—No important new business is reported in this market. Buyers are apparently waiting to see whether sulphate will further recede in value. The little business that has been done has, in all instances, been below £9; the price being about £8 17s. 6d., less 3½ per cent., in all quarters. The shipments this year so far are much below those of last; but this arises entirely from the circumstance that, during the first part of last year, very large accumulated stocks were disposed of. The production of sulphate from gas-works this season, it will be seen, is considerably below that of the corresponding period of last year.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—Although the better qualities of round coal are kept moving off fairly well owing to the return of winterlike weather, and pits continue on full time, the position remains anything but a satisfactory one; the output being ample to meet all requirements, with heavy stocks remaining on hand at most of the collieries. During the past week, prices have begun to show some slight weakening tendency in isolated cases; representatives of collieries being here and there prepared with some concession upon list rates to effect sales. Generally, however, quotations are unchanged. From 10s. to 10s. 6d. per ton is the average figure for better qualities of Wigan Arley; 8s. 6d. to 9s. for Pemberton four-feet and seconds Arley; and about 7s. for the commoner qualities of house-coal. Notwithstanding the exceptional activity in all the iron-using branches of industry, and the consequent full average demand upon the commoner round coals for steam and forge purposes, supplies of these continue in excess of requirements; and prices are low. Ordinary qualities are obtainable at about 6s. to 6s. 6d. per ton at the pits; while for shipment, though there is perhaps more business coming forward, low rates continue to be taken—common steam coal being offered at 7s. 6d. to 7s. 9d. per ton, with better qualities fetching 8s. to 8s. 3d. delivered at

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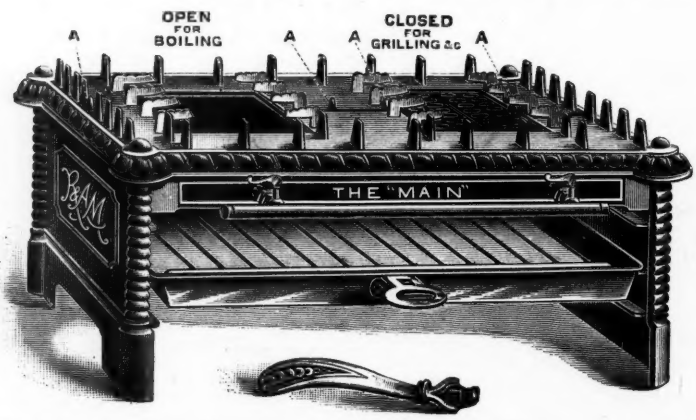

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ports on the Mersey. Engine classes of fuel move off fairly well, with supplies of slack short at some collieries; but notwithstanding this, there is no scarcity in the open market, and increased quantities of slack are beginning to come forward from other districts. The result is that though prices are steady at late rates, any upward move—which in one or two instances has been attempted—would seem to be altogether out of the question. At the pit, common slack does not average more than 3s. to 3s. 6d. per ton; medium, 3s. 9d. to 4s. 3d.; best, 4s. 6d. to 4s. 9d.

Northern Coal Trade.—The coal trade of this district is excited by the possibility of a labour stoppage in South Wales; and a number of orders that would have gone to Wales have been sent here in consequence of the doubt as to the working of the pits there after the beginning of April. Hence prices have advanced. Best Northumbrian steam coals have risen to about 9s. per ton f.o.b.; second-class steam, to 8s. 6d.; and steam smalls, to 3s. 6d. In the gas-coal trade there has been a better demand, and the local consumption has increased with the keener weather; but the output is ample, and the exports to the North have scarcely commenced yet. Prices of gas coals are quiet. The Christiania and one or two minor gas coal contracts have been settled; and the price is generally on the basis of an advance of about 6d. per ton on last year's rates. Manufacturing coals are in fuller demand, without variation in the quotation. Gas coke is unaltered.

Scotch Coal Trade.—The demand continues good, being helped considerably by the uncertainty which exists as to what is to happen in Wales. Forward inquiries are being made for all. Splint is plentiful, and somewhat easier in price. Main is moving off regularly, and is otherwise unchanged. The prices quoted are: Main, 6s. 6d. per ton f.o.b. Glasgow; ell, 7s. (easy); and splint, 7s. 3d. to 7s. 6d. The shipments for the week amounted to 135,029 tons—an increase of 1432 tons upon the previous week, and of 1863 tons upon the corresponding week of last year. For the year to date, the shipments have been 1,412,785 tons—an increase upon the same period of last year of 27,684 tons.

Messrs. Biggs, Wall, and Co., have secured the contract for the supply of 700 tons of 12-inch pipes for the Ryde Water-Works.

A contract has been placed with Messrs. R. Dempster and Sons, Limited, of Elland, for the steel tank and gasholder required by the Durham Gas Company.

In conjunction with the Corporation Gas Department, Messrs. John Wright and Co. held an exhibition of stoves and other appliances at Rochdale last week. Lectures were delivered by Miss Margaret Wright. Messrs. Charles Wilson and Sons are holding an exhibition in the Albert Hall, Leeds, with cookery demonstrations by Miss Morgan. Messrs. W. Parkinson and Co. held a gas exhibition from Monday to Friday last week, under the auspices of the Manchester Corporation Gas Department, in the Whitworth Public Hall, Openshaw. Practical lessons on cookery were given twice daily by Miss Edith Sanderson.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

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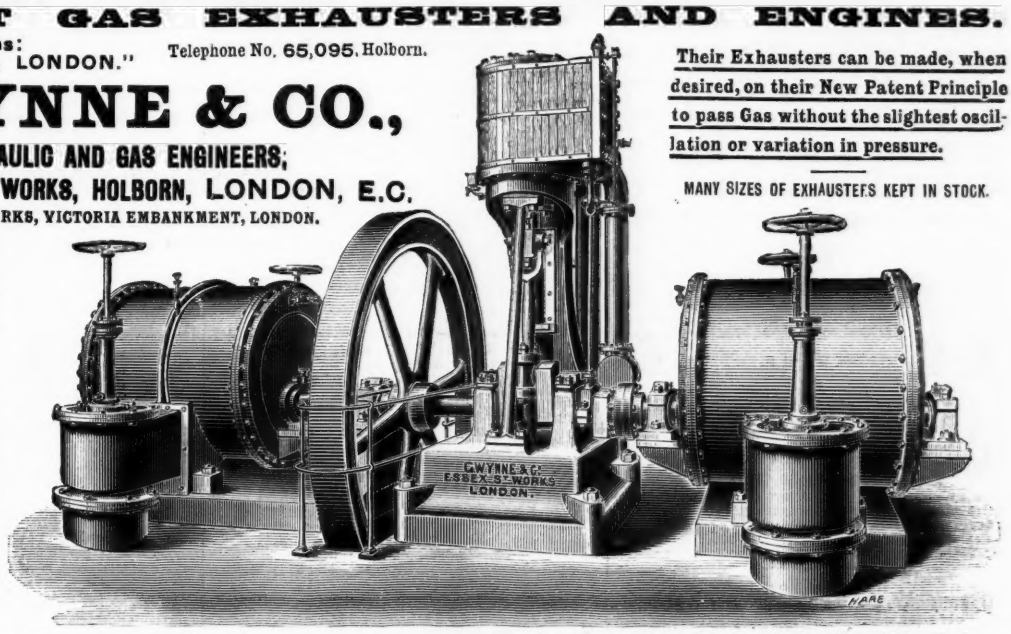

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WANTED, an experienced Gas-Meter and GOVERNOR PROVER. Permanent job to a good Man.
Apply, by letter, to No. 3028, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

COAL Contractors and Shippers require services of Gentleman as REPRESENTATIVE for Ireland and Parts of England. Experience and first-class References essential.
State full Particulars, in confidence, to No. 3026, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ASHBOURNE GAS COMPANY.

MANAGER wanted. Must be well up in Production, Distribution, and Fitting. Make about 20 millions.
Applications with References, stating Wages, &c., to JOSEPH BRADLEY, Secretary.

CORPORATION OF ROTHERHAM.
(GAS DEPARTMENT.)

WANTED, a Draughtsman, for about two Months.
Apply, stating Salary expected, not later than March 31, to FRANK A. WINSTANLEY, Engineer.
Gas Offices, Rotherham.

WANTED, a Working Manager for small Gas-Works in Australia, who thoroughly understands Carbonization, Works Management, Meter Repairing, Gas-Fitting, and keeping simple Accounts. Married man, and Total Abstainer preferred. Weekly wage, £2 7s. 6d., with House.
Apply, in own Handwriting, stating Age, with Testimonials, to No. 3029, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

KING'S TREATISE ON COAL GAS.

VOLUMES I. and II. wanted by Adver- tiser.
State Price and Condition to No. 3023, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a good second-hand Steam ENGINE and EXHAUSTER of 10,000 cubic feet capacity (either separate or combined), with Disc Valves, Governor, Throttle Valve, &c., complete, preferably to connect to 10-inch diameter Mains.
Reply, stating lump sum price, and where to be seen, to No. 3024, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—12-inch Governor by Peebles. 42 4-inch White's ANTI-DIP VALVES. No reasonable offer refused.
Apply to the MANAGER, Gas-Works, ILKESTON.

EXHAUSTER for Sale, second-hand, Waller double-blade, capable of passing 17,000 cubic feet per hour. Price £15.
Apply to Mr. COOPER, Gas-Works, BANBURY.

GAS-PUMP for Sale, horizontal, one Steam Cylinder, 18-inch bore, and two Gas Cylinders, 17½-inch bore, all 24-inch Stroke, on massive Bed-Plate, with heavy Fly-Wheels. Very strong. First-Class Make. Not much used.
Apply, by letter, to No. 2878, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE, as a Going Concern—A small GAS-WORKS (Freehold Property) near the Eastern Coast.
The Works are in full working order; and there is a good Coal Business attached.
Apply, in first instance, to Mr. W. H MORGAN, Consulting Gas and Chemical Engineer, RHAYADER.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. **Compare Prices and Particulars before ordering elsewhere.**
J. F. BLAKELEY, Gas Engineer, Ravensthorpe, YORKS.

FOR SALE—

16	Round	MOUTHPIECES,	16 in.	dia.,	4 in.	Sockets.
4	"	"	16 in.	"	6 in.	"
6	"	"	18 in.	"	4 in.	"
5	Oval	MOUTHPIECES,	21 in. by 15 in.,		4-inch	Saddle Sockets.
6	Oval	MOUTHPIECES,	20 in. by 13 in.,		4-inch	Saddle Sockets.

With 4-inch DIP-PIPES, BRIDGE-PIECES, and a number of ASCENSION-PIPES and CONNECTIONS.
Apply R. WATSON, Gas-Works, HERTFORD.

FOR SALE, Cheap—The under- mentioned GAS PLANT:—

		Square. Ft. in.	Deep. Ft. in.		
2	PURIFIERS,	8 0	4 6	6-in.	Valves & Connections.
1	"	7 6	4 6	6 "	" "
2	"	5 0	4 0	4 "	" "
1	"	5 0	2 9	4 "	" "

C-I. SCRUBBER, 38ft. 6in. high, 6ft. dia., 14-in. "
CONDENSER, 4 inches diameter, Vertical Pipes.
EXHAUSTER (Gwynne's) 20,000 c.f. per hour 8-in. Valves
Apply to SAML. WHILE AND SONS, 60, QUEEN VICTORIA STREET, E.C.

FOR SALE—A Modern Sulphate of AMMONIA STILL, built by Messrs. R. & J. Dempster, Manchester, 1893, with separate Liming Compartment. Capacity, with ordinary Liquor, 5000 to 6000 lbs. of Sulphate per day.
For further Particulars, apply to the BRYMBO STEEL COMPANY, LIMITED, near WREXHAM.

LEIGH URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

FOR SALE—Thirty Retort Mouthpieces, with Self-Sealing Lids. Size 21 in. by 15 in., D shape. No reasonable offer refused.
Full Particulars, &c., from the undersigned.
JOHN FOSTER, Engineer and Manager.
March 25, 1898.

WANTED, Tenders for 100 Tons of COKE.
Address ROTHWELL GAS COMPANY, Rothwell, near KETTERING.

SKIPTON GAS COMPANY.

THE Directors of this Company are pre- pared to receive TENDERS for the supply of 7000 Tons of best screened GAS COAL, to be delivered in such quantities, and at such times as may be required during Twelve Months ending June 30, 1899.
Quotations to specify price per ton free on rails at Skipton, or delivered into the Company's Coal-Sheds alongside the Canal. Endorsed Tenders to be sent to me not later than April 11 next.
The Directors will not be bound to accept the lowest or any Tender.
J. HAIGH, Secretary.
March 14, 1898.

URBAN DISTRICT COUNCIL OF BUXTON.
(GAS DEPARTMENT.)

TENDERS are invited for the supply and erection of a CAST-IRON TANK, 35 ft. by 25 ft. by 4 ft. deep, with division to form Two Tanks—one for Tar and the other for Liquor—covered with Timber and Galvanized Corrugated Iron.
One TAR SEPARATOR.
Six STEEL ROLLED GIRDERS, 6 in. by 6 in. by 16 in. by 25 ft. long.
Drawing and Specification to be seen, and any other Information to be had, on application to Mr. Smedley, Gas Engineer.
The Committee do not bind themselves to accept the lowest or any Tender.
Sealed Tenders, endorsed "Tender for Tar-Tank," to be sent in not later than Twelve Noon, April 6, addressed to the Chairman of the Gas Committee.
JOSIAH TAYLOR, Clerk to the Council.
Town Hall, Buxton.

COUNTY BOROUGH OF WIGAN.

TENDERS FOR GOODS.

THE Gas and Electric Lighting Com- mittee invite TENDERS as follows:—

Contract No.	1.	Cast Mains and Connections.
"	2.	Wrought-Iron Tube and Fittings.
"	3.	Brass Tube and Fittings.
"	4.	Lead Pipe.
"	5.	Firing and Charging Shovels.
"	6.	Brooms.
"	7.	Wood Troughing and Covering.
"	8.	Galvanized Stove Pipe & Connections.
"	9.	Bar Iron.
"	10.	Street-Lamps.
"	11.	Galvanized Iron Buckets.

The Contracts will be for One Year, commencing on the 1st of April, 1898, and ending on the 31st of March, 1899.
Forms of Tender to be obtained from the undersigned.
The Committee do not bind themselves to accept the lowest or any Tender.
Tenders, sealed, and endorsed with the name of the article tendered for (a sample of which must be forwarded, addressed to the Gas Engineer), to be addressed and delivered to J. J. Charnock, Esq., Town Clerk, Town Hall, on or before Tuesday, the 19th of April next.
J. TIMMINS, Engineer.
Borough Gas-Works, Wigan,
March 24, 1898.

STRETFORD GAS COMPANY.

CONTRACTS FOR STORES.

THE Directors of the Stretford Gas Company invite TENDERS to supply for a period of Twelve Months the following STORES:—

No. 1.	Iron and Steel.	No. 8.	Paints.
" 2.	Lead and Brass Tubes, &c.	" 9.	Chandlery.
		" 10.	Oils, &c.
" 3.	Bolts, Nuts, Rivets, &c.	" 11.	Engine Waste.
		" 12.	Fire Brick and Clay, Cement, Lime, &c.
" 4.	Cast-Iron Pipes and Castings.	" 13.	Ironmongery.
" 5.	Brass Meter Taps, Keys, &c.	" 14.	Ropes, Yarn, &c.
		" 15.	Steel Shovels, &c.
" 6.	Gas and Steam Tubing.	" 16.	Brushes.
		" 17.	Rubber Goods, Packing, &c.
" 7.	Wet and Dry Gas-Meters.		

Further Particulars may be had, and Samples inspected, on application to the Gas Engineer, Mr. H. Kendrick.
Forms of Tender to be obtained from the Secretary, Gas-Works, Stretford.
The Directors reserve the power to accept the whole or part of a Tender, and do not bind themselves to accept the lowest or any Tender.
Tenders, sealed, and endorsed "Tenders for Stores," to be addressed to the Chairman of the Directors, and delivered at the Gas-Works, Stretford, Manchester, on or before Tuesday, the 12th of April, 1898.
Samples to be addressed to the Gas Engineer.
By order,
BENJAMIN HAYNES, Secretary.
March 23, 1898.

EAST LONDON WATER-WORKS COMPANY.

NOTICE is Hereby Given, that the HALF-YEARLY ASSEMBLY of Proprietors will be held at the Company's Offices, St. Helen's Place, Bishopsgate, E.C., on Thursday, the 7th of April, 1898, at Twelve o'clock noon precisely, pursuant to Act of Parliament.

The Transfer Books in respect of the ORDINARY STOCK WILL BE CLOSED on the 24th of March, and RE-OPENED on the 14th of April, on which day the Dividends on this Stock will be payable.

By order,
I. A. CROOKENDEN,
Secretary.

St. Helen's Place, E.C.,
March 10, 1898.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held MONTHLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by Auction of Gas and Water Stocks and Shares under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. Alfred Richards's Offices, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the Hornsey Gas Company, the Directors of the Maidstone Gas Company, and other Owners.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, E.C., on Monday, April 4, at Two o'clock, in Lots:

HORNSEY GAS COMPANY—£5000 FIVE PER CENT. PREFERENCE STOCK.

MAIDSTONE GAS COMPANY—£6000 THREE PER CENT. PERPETUAL DEBENTURE STOCK; also Shares in the

BOURNEMOUTH GAS AND WATER COMPANY, ASCOT DISTRICT GAS COMPANY, and WALTON-ON-THAMES GAS COMPANY.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

TAR.

THE Direction of the Gas-Works at Rotterdam invite TENDERS for the purchase of the TAR produced during One Year, from the 1st of June next. (Yearly production from about 83,000,000 Kg. of Coal.)

Tenders, stating the price per hectolitre in Dutch Money, and written in Dutch Language on stamped paper, must be delivered at the Office of the Gas-Works, not later than the 13th of April, 1898.

Specifications may be had on application to the MANAGER of the Gas-Works at ROTTERDAM.

TUNBRIDGE WELLS GAS COMPANY.

TO COAL FACTORS AND OTHERS.

THE Directors of the Tunbridge Wells Gas Company will be prepared on Tuesday, the 12th day of April next, to receive TENDERS for the supply of 20,000 Tons of good, clean, unscreened GAS COALS, to be delivered free into the Gas Company's Siding on the South-Eastern Railway, at Tunbridge Wells, in accordance with the Terms and Conditions which may be obtained on application.

The Tenders to be sent to me by not later than Six o'clock p.m., on Tuesday, the 12th day of April, marked "Tender for Coals."

The lowest or any Tender will not necessarily be accepted.

By order,
JOHN READ,
Secretary and General Manager.

Gas Company's Office: 44, High Street,
Tunbridge Wells, March 17, 1898.

LEIGH URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Gas Committee of the above Council invite TENDERS for the purchase (including taking down and clearing away) of an old GASHOLDER, 52 ft. 6 in. diameter by 17 feet deep, with six Cast-Iron Columns.

Forms of Tender and further Particulars may be obtained from the Engineer, Mr. J. Foster, Gas-Works, Leigh.

Sealed Tenders, endorsed "Tender for Gasholder," to be sent in to me, the undersigned, on or before Twelve o'clock Noon on Monday, April 18, 1898.

By order,
PEREGRINE THOMAS,
Clerk to the Council.

Town Hall, Leigh, Lancs.,
March 25, 1898.

LURGAN GAS, LIGHT, AND CHEMICAL COMPANY, LIMITED.

COAL WANTED.

THE Directors invite Tenders for the supply of 3000 Tons best quality screened GAS COAL delivered into Lighters, or placed on Rail, at Belfast.

One-third of the required quantity should be Scotch Coal, suitable for use in Hislop's Patent Regenerative Furnaces.

Delivery of 2500 Tons can be taken before the 1st of November; the remainder to be delivered at such times and in such quantities as may be required. Each cargo must be accompanied by a certificate as to place of origin.

Tenders (in sealed envelope), accompanied by reference to Gas-Works using the Coal offered, should reach me not later than Eleven o'clock in the forenoon of Saturday, April 2, 1898.

The Directors do not bind themselves to accept the lowest or any Tender.

FRED. W. MAGAHAN,
Secretary.

Gas-Works, Lurgan,
March 14, 1898.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.
Prices and Analysis of all the Scotch Cannels on Application.

NEWBATTLE CANNEL.
Highest Results in Gas, & Excellent Coke.
QUOTATIONS ON APPLICATION TO
THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

ALEXANDER CAMERON,
GAS AND CANNEL COAL MERCHANT,
48, WEST REGENT STREET,
GLASGOW.

GAS PURIFICATION BY
HYDRATED OXIDE.
THIS Material is of full Strength, and Exceptional Activity. It is specially prepared to minimize Back-Pressure; and will be supplied on Hire, or Sold, on the most favourable Terms.
SPENT OXIDES containing Blue, also CRUDE FERRO-CYANIDE PRODUCTS, either PURCHASED or EXCHANGED for FRESH OXIDE.
MANCHESTER OXIDE COMPANY, LTD.,
CANAL ST., MILES PLATTING, MANCHESTER.

LONDONDERRY GAS COALS
FROM THE
MARQUIS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.
Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.
FOR PRICES AND PARTICULARS, APPLY TO
S. J. DITCHFIELD,
SEAHAM HARBOUR, COUNTY OF DURHAM.

THE SILICA FIRE-BRICK COMPANY,
OUGHTIBRIDGE, near SHEFFIELD,
MANUFACTURE
SILICA BLOCKS, BRICKS, AND CEMENT
OF SUPERIOR QUALITY
FOR GAS-FURNACES.
Trade Mark: "SILICA."
These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their
GREATER DURABILITY,
Strongly recommended where EXCESSIVE HEATS have to be maintained.

UNEQUALLED.
Gas Companies are solicited to try Samples of the
MIRFIELD
BLACK BED GAS COAL.
Prices and Analysis on application.
MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

Telephone: Castleford No. 214. | Postal Address: Castleford.
Telegrams: "Silkstone Castleford."
THE SILKSTONE & HAIGH MOOR COLLIERIES, LTD.
ALLERTON BYWATER, CASTLEFORD.
Steam, Manufacturing, & Gas Coals & Cannel.
Analysis, Contracts, Trial Waggons, and Quotations for Large and Small Orders. Inquiries Solicited.

HEATHCOTE GAS COAL.
Rich in Illuminating Power and Yield of Gas. Above the Average in Weight and Quality of Coke.
Maintains a High Standard in Residuals.
THE GRASSMOOR CO., LD.
CHESTERFIELD.

THOMAS TURTON AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS,
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

INCANDESCENT
GAS LIGHTING
Has now gained a complete and final Victory over its last and greatest Enemy
VIBRATION,
BY MEANS OF
CLAY'S PATENT
SHOCK-PROOF
Incandescent Burner Fittings
Of which full Particulars may be had from
CLAY & WALMSLEY,
BOLTON, ENGLAND.
Telegrams: "CLAYS, BOLTON."
See "JOURNAL OF GAS LIGHTING," July 7, 1896, p. 19, and Dec. 21, 1897, p. 1365.
London Representatives: Messrs. Henry Greene & Sons, 153 & 155, Cannon Street, E.C.

TROTTER, HAINES, & CORBETT,

Brettell's Estate

FIRE-CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Proprietors of

BEST GLASSHOUSE POT & CRUCIBLE CLAY.

Shipments Promptly and Carefully Executed.

London Office: R. Cull, 84, Old Broad St., E.C.

JAMES OAKES & Co.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

Note.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

HOLMSIDE GAS COALS.

Present Daily Produce over 5000 Tons.

Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton	11,205 Cubic Feet.
Illuminating Power	16 7/10 Stand. Sperm. Candl.
Coke (of good & pure quality)	13¾ Cwt. per Ton.
Sulphur	A little over 1 per Cent.
Ash	Under 1 per Cent.
Tar	163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor	103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England, and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

Present Daily Produce available 3000 Tons.

Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.

Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE & SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

WATERBLEAN PAINT

Telegrams: "EVESON, BIRMINGHAM."

EVESON FOR CANNEL

TUBES AND FITTINGS

ALL KINDS

WRITE FOR PRICES

STAFFORDSHIRE TUBE Co., BIRMINGHAM.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·4 candles.
Coke	68 per cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to

THE WALLSEND & HEBBURN COAL COMPANY, LTD.,
8 Lombard Street, NEWCASTLE-ON-TYNE.

W. RICHARDSON, Fitter.

BOLDON GAS COALS.

ANALYSIS.

Yield of Gas per ton	10,500 Cubic Feet.
Illuminating Power	16·9 Candles.
Coke	66·7 Coke.
Sulphur	0·86 Sulphur.
Ash	2·04 Ash.

For Prices, &c., apply to

W. H. PARKINSON,
THE HARTON COAL CO., LTD.,
NEWCASTLE-ON-TYNE.

Telegraphic Address: "PARKINSON NEWCASTLE."

THORNLEY GAS COALS

WORKED BY THE

WEARDALE IRON & COAL Co., Ld.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by

Messrs. J. & H. S. PATTINSON, *May 28, 1895.*

Yield of Gas per Ton	10,500 Cub. Ft.
Illuminating Power	16·9 Candles.
Coke (of good quality)	67·5 per Cent.
Sulphur	0·58 ,,
Ash	2·73 ,,

For Price, &c., apply to the

WEARDALE IRON & COAL Co., Ld.

QUAYSIDE, NEWCASTLE-ON-TYNE.

FIRE-BRICKS, FIRE-CLAY, & FURNACE CEMENT.

THE

FURNACE FIRE-BRICK CO., Ltd.

(Late JAMES WHITE & CO.)

WORKS:

Longcliffe, near Wirksworth, Derbyshire.

Manufacturers of

HIGH-CLASS FIRE-BRICKS, acknowledged to be the best obtainable for

GAS, IRON, AND CHEMICAL FURNACES.

For Analysis and Prices, address—

JAMES WHITE & CO.,

WIDNES, LANCASHIRE.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	17·8 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE & SONS,
Coal Owners, Newcastle-on-Tyne;
or
E. FOSTER & CO.,
21, John Street, Adelphi, London W.C.

D. HULETT & CO., LTD.,

55 & 56, HIGH HOLBORN, LONDON.

"HANDY" SERVICE CLEANSERS.

Light and Powerful. Price 50s. each.

DRY GAS-METER MAKERS.

WROUGHT-IRON TUBES AND FITTINGS.

STREET LAMPS & COLUMNS.

Price Lists on Application.

REGENERATIVE RETORT-SETTINGS.

J. FIRTH BLAKELEY & CO., GAS ENGINEERS AND CONTRACTORS, RAVENSTHORPE, YORKS,

Have made arrangements with **Mr. ALEXANDER YUILL**, of Alloa, N.B., for the **SOLE RIGHT** of **BUILDING** his **REGENERATIVE FURNACES and SETTINGS OF RETORTS.**

By Mr. Yuill's Principle, **the maximum quantity of Gas** per Retort per diem may be obtained with the **minimum amount of fuel.**

Gas Managers who are desirous of improving their Settings should ask for Particulars and Prices **before adopting any other principle.**

They give the **best results, are reliable,** and **economical in construction.**

GAS APPARATUS OF ALL KINDS SUPPLIED.

[ESTABLISHED 1844.] **ORIGINAL MAKERS.** [ESTABLISHED 1844.]

LONDON, 1851. NEW YORK, 1853. PARIS, 1855. LONDON, 1862. DUBLIN, 1865. PARIS, 1867.

THE SIX MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS;

The latter being the Highest Award for Dry Gas-Meters at the Paris Exhibition, 1867. Since then we have not Exhibited FOR PRIZES.

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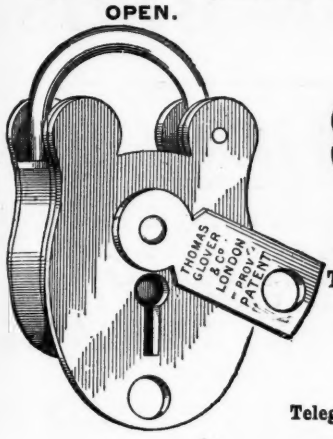

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PATENT

SECURE PADLOCK

Prevents Tampering with the

CASH-BOXES OF PREPAYMENT METERS.

The Padlock is Sealed by means of a Lead Eyelet, which is impressed with Company's private mark.

Eyelets easily fixed and removed by Company's Collector.

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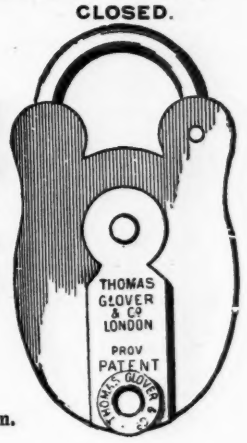

Telegraphic Address: "GOTHIC LONDON." Telephone No. 725, Holborn.

THOMAS GLOVER & CO., LTD.,

DRY GAS-METER MANUFACTURERS,

214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.

BRISTOL:	BIRMINGHAM:	MANCHESTER:	GLASGOW:
28, BATH STREET.	1, OOZELLS STREET.	37, BLACKFRIARS STREET.	ARGYLE WORKS, KINNING PARK.
Telegraphic Address: "GOTHIC."	*Telegraphic Address:* "GOTHIC."	*Telegraphic Address:* "GOTHIC."	*Telegraphic Address:* "GASMAIN."
Telephone No. 1005			Telephone No. 1325 South Side.

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60, QUEEN VICTORIA ST. E.C.

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"HALIFAX EXCHANGE"

GAS ENGINEERS.
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SOLE AGENTS FOR
HISLOP'S
PATENT REGENERATIVE FURNACES
— FOR —
ENGLAND, WALES & ABROAD.
RETORT BENCHES ERECTED COMPLETE WITH OR WITHOUT SPECIAL FURNACES.
RESULTS GUARANTEED.

JONAS DRAKE & SON

OVENDEN HALIFAX

RETORT SETTERS.
FURNACE BUILDERS.
ETC. ETC.

Designs and Estimates on Application.

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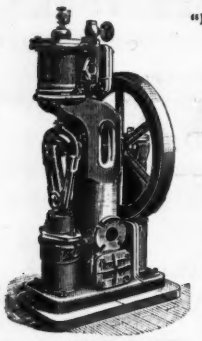


Fig. 703. "SINGLE RAM" STEAM-PUMP.

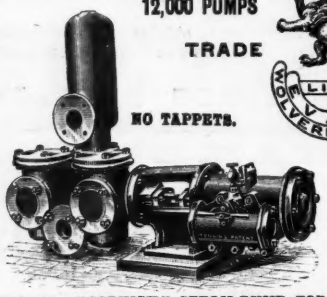


Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

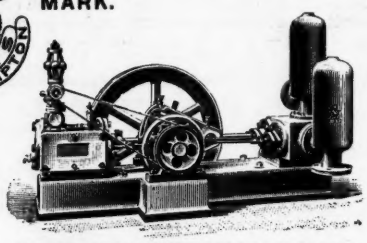


Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

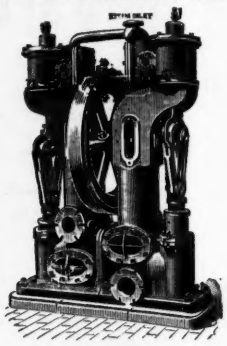
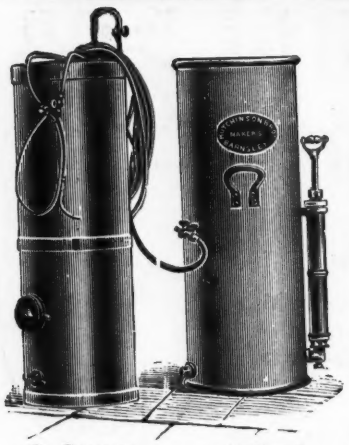


Fig. 712 "DOUBLE-RAM" STEAM-PUMP.



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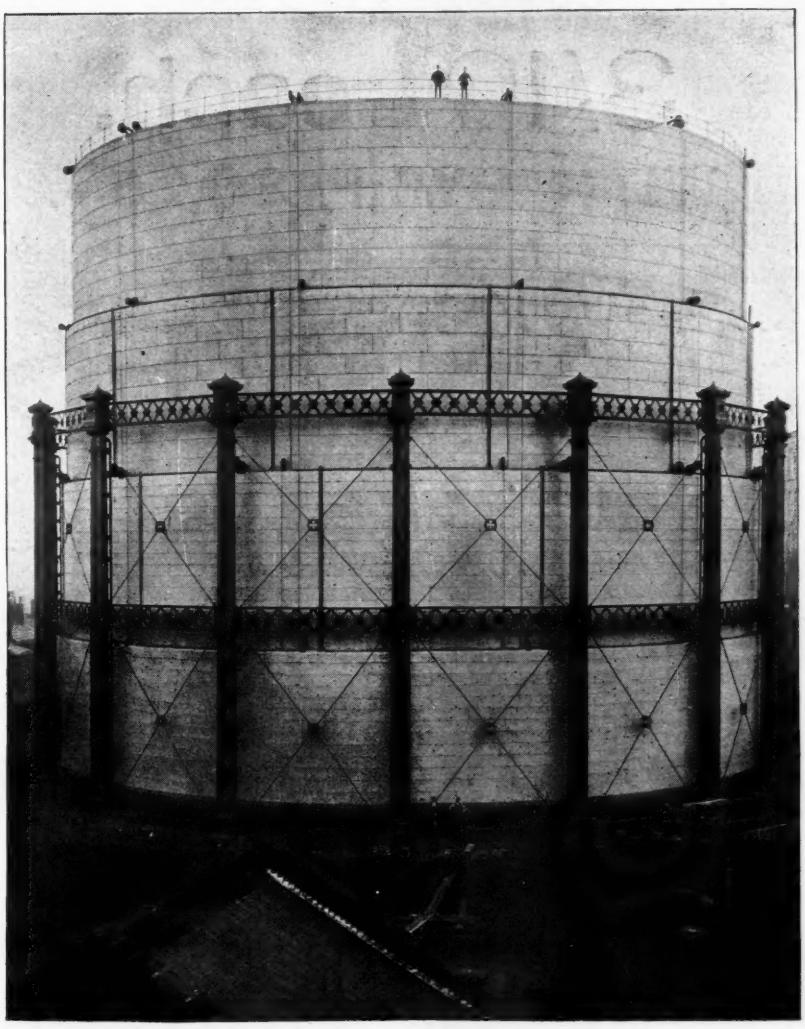

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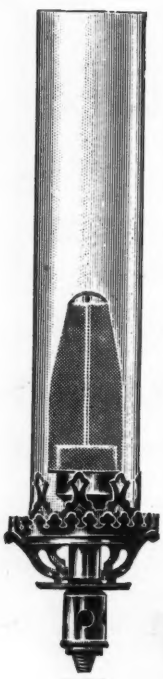

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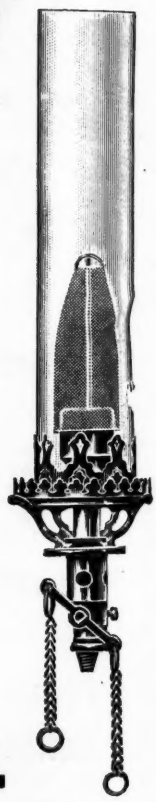

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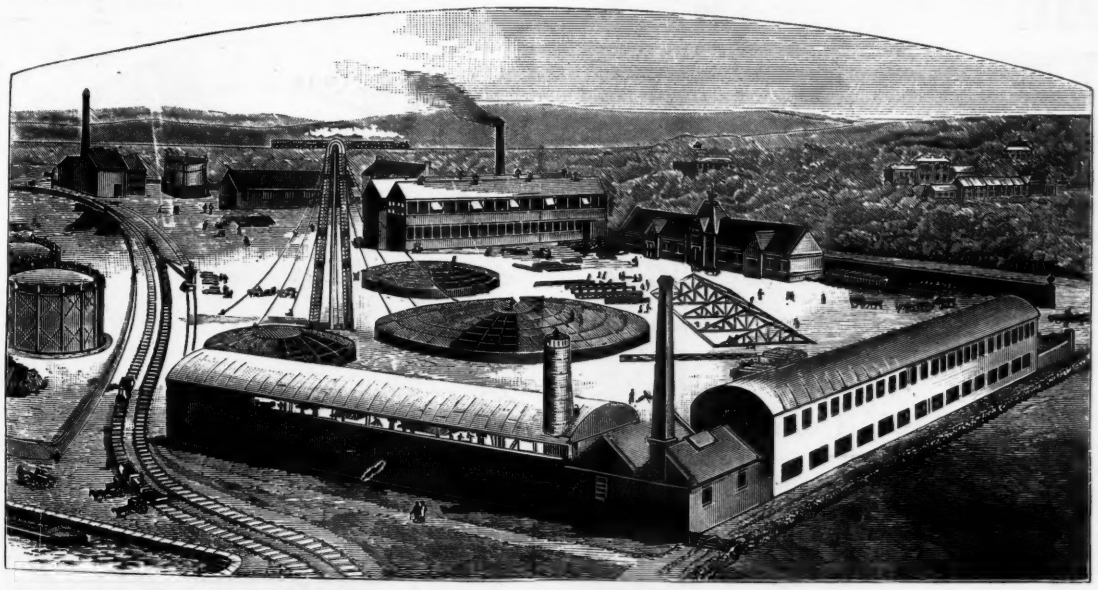

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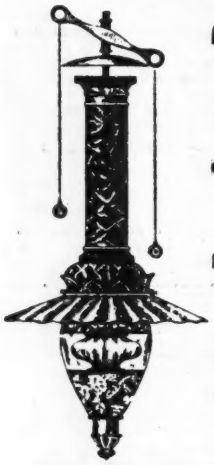

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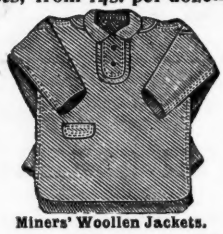
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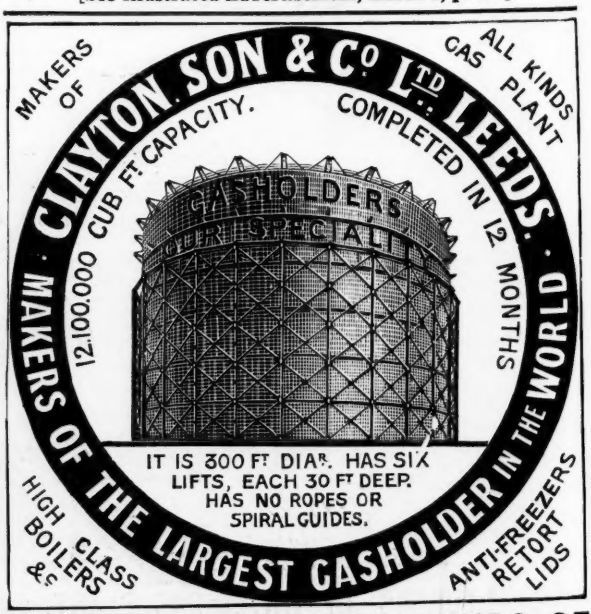
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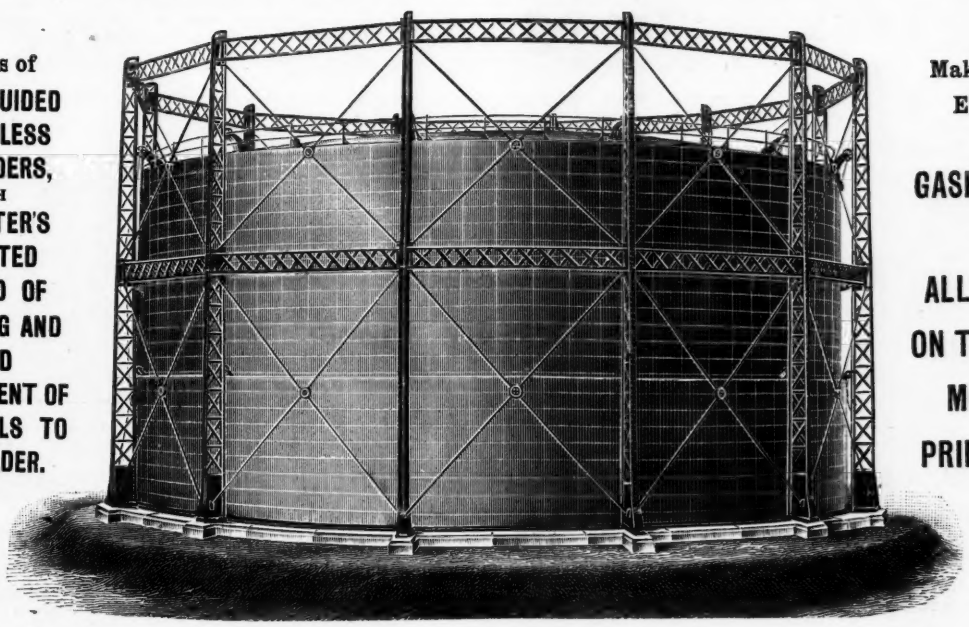

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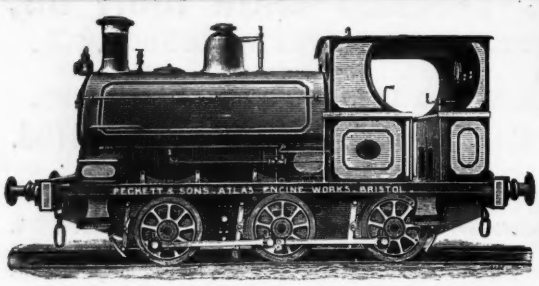

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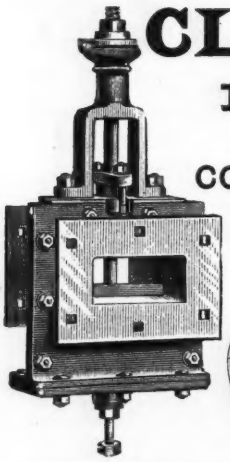

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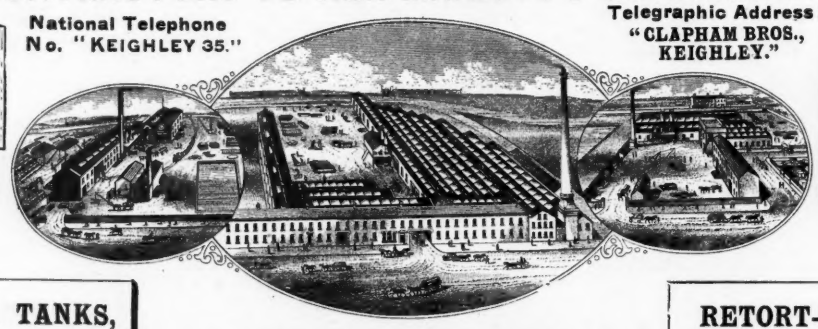

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